

No. 16-0933

IN THE
United States Court of Appeals
for the Twelfth Circuit

CORDELIA LEAR,

Plaintiff-Appellee-Cross Appellant,

v.

UNITED STATES FISH AND WILDLIFE SERVICE,

Defendant-Appellant-Cross Appellee,

and

BRITAIN COUNTY, NEW UNION,

Defendant-Appellant.

Appeal from the Union States District Court
for the District Court of New Union

BRIEF FOR UNITED STATES FISH AND WILDLIFE SERVICE

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JURISDICTIONAL STATEMENT

This appeal arises from the judgment of the United States District Court for the District of New Union, which determined that the Endangered Species Act is a legitimate congressional act under the Constitution's Interstate Commerce Clause and that both the Endangered Species Act's take provision and Brittain County's Wetlands Preservation Law constituted a taking of plaintiff's property for which she was entitled to compensation under the Fifth Amendment.

In accordance with 28 U.S.C. §1331, the District Court of New Union has original jurisdiction over all civil actions under the Constitution and laws of the United States.¹ Pursuant to 28 U.S.C. §1291, the United States Court of Appeals for the Twelfth Circuit has jurisdiction of the appeal from the final decision of the District Court.² Therefore, as the District Court for the District of New Union entered the final decision and order in this matter on June 1, 2016, this matter is properly before this Honorable Court.

STATEMENT OF ISSUES TO BE PRESENTED

- (1) Whether there was a plain showing of error in Congress's rational basis that the Endangered Species Act, aimed to preserve genetic diversity and regenerate jeopardized species for commercial exploitation, was a valid exercise under the Interstate Commerce Clause.
- (2) Whether Lear's takings claim against FWS was ripe without having applied for an ITP under ESA § 10, 16 U.S.C. § 1539(a)(1)(B)?
- (3) For takings analysis, whether the relevant parcel is the entirety of Lear Island, or merely Cordelia Lot as subdivided in 1965, given its long history as a unified productive unit?
- (4) Assuming the relevant parcel is the Cordelia Lot, does the fact that the butterfly habitat is naturally temporary, and would disappear in ten years absent Plaintiff's maintenance shield FWS

¹ 28 U.S.C. § 1131 (2012).

² 28 U.S.C. § 1291.

and Brittain County from a takings claim based upon a complete deprivation of economic value of the property?

(5) Assuming the relevant parcel is the Cordelia Lot, does the Brittain County Butterfly Society's offer to pay \$1,000 per year in rent for wildlife viewing preclude a takings claim for complete loss of economic value?

(6) Whether the public trust doctrine, which reserves title to land beneath navigable waterways and other natural resources to the State to hold in trust for public use, precluded Lear's claim for a taking based on the denial of a county wetlands permit.

(7) Assuming the relevant parcel is the Cordelia Lot, are FWS and Brittain County liable for a complete deprivation of the economic value of the Cordelia Lot when either the federal or county regulation, by itself, would still allow development of a single-family residence?

STATEMENT OF THE CASE

The Karner blue is one of many endangered butterfly species under constant threat from human expansion.³ While they are delicate and have difficulty migrating to new habitats, the Karner blues can be moved with human assistance.⁴ The last vestige of New Union's Karner blue population is located on the northern tip of Lear Island.⁵

Congressionally granted to Cornelius Lear in 1803 in fee simple absolute when the land was part of the Northwest Territory, Lear Island is approximately two miles long and one mile wide and consists of 1,000 acres.⁶ For 162 years, the Lear family exploited the island as a homestead, farm, and hunting and fishing ground.⁷ In 1965, King James Lear owned the entirety

³ Order at 5 ¶8, *Lear v. U.S. Fish & Wildlife Serv., et al.*, No. 112-CV-2015-RNR (2016) (No. 16-0933) [hereinafter App. A]. The Order is attached as Appendix A.

⁴ App. A at 5–6 ¶9; App. B at 13.

⁵ App. A at 5 ¶7.

⁶ App. A at 4 ¶1, 5 ¶1

⁷ App. A at 5 ¶2.

of the island, but subdivided the property into three parcels, one for each daughter, and reserved a life estate in each lot for himself. The Brittain Town Planning Board approved the subdivision, pending that future development would comply with zoning regulations. Lear then built a residence on the Regan Lot for his daughter as he continued to live in the historic homestead on the Goneril Lot.⁸ When King Lear died in 2005, his daughters inherited their deeded properties.⁹

In April 2012, Cordelia Lear (“Plaintiff”) sought to build on her inherited lot, which was, incidentally, the same location of the last remaining population of the Karner blue in New Union.¹⁰ Of Plaintiff’s ten-acre lot, nine acres and a forty-foot-by-1,000-foot long access strip are kept open by annual mowing every October.¹¹ Without annual mowing, trees would gradually cover the fields and would result in the loss of the partially shaded wild lupine, upon which the Karner blue’s existence depends.¹²

Plaintiff contacted the Fish and Wildlife Service (“FWS”) once to inquire what the relevant steps would be to build on her lot. FWS responded that any disturbance of the lupine habitat other than continued annual mowing would be considered a “take” of the Karner blue. FWS informed Plaintiff that it would be possible to obtain an Incidental Take Permit (“ITP”), which would require development of a habitat conservation plan (“HCP”). FWS then advised Plaintiff that one such HCP would have to provide for additional contiguous lupine habitat on an acre-for-acre basis and would require continued annual fall mowing. Goneril Lear, whose lot is adjacent to Cordelia’s lot, has refused to cooperate with a HCP that involves restrictions on her

⁸ App. A at 5 ¶3.

⁹ App. A at 5 ¶4.

¹⁰ App. A at 5 ¶4.

¹¹ App. A at 5 ¶6.

¹² App. A at 6 ¶10, 7¶15.

property.¹³ Plaintiff has a single quote from an environmental consultant who advised that preparation and application for the ITP and HCP would cost \$150,000.00.¹⁴ Following Plaintiff's initial inquiry, FWS sent a letter to Plaintiff on May 15, 2012, confirming that any disturbance to the lupine besides the October mowing would constitute a take. The letter also referred Plaintiff to the HCP handbook and reiterated some of the minimal requirements for one type of HCP.¹⁵ Plaintiff did not contact FWS again.¹⁶

Rather than pursue an ITP application with FWS, Plaintiff developed an alternative development proposal ("ADP") that would not disturb the lupine fields. Plaintiff would fill a one half-acre portion of marsh on her parcel for her residence.¹⁷ Plaintiff filed a permit with the Brittain County Wetlands in August 2013, but because the proposed home was not a water-dependent use, the Wetlands Board denied the permit in December 2013.¹⁸

In the absence of restriction against residential development, the Cordelia Lot's market value is \$100,000.00 with property taxes of \$1,500.00. The Cordelia Lot in its present state does not have a market within Brittain County for recreational, agricultural, or timber use. Plaintiff has not reassessed her property following the ADP denial. Plaintiff also rejected the Brittain County Butterfly Society's gracious offer to pay her \$1,000.00 annually for the privilege of conducting butterfly viewing.¹⁹

In February 2014, Plaintiff commenced this action, seeking a declaration that the Endangered Species Act ("ESA") was an unconstitutional extension of the Interstate Commerce

¹³ App. A at 6 ¶11.

¹⁴ App. A at 6 ¶13.

¹⁵ App. A at 6 ¶14.

¹⁶ App. A at 7 ¶15.

¹⁷ App. A at 7 ¶16.

¹⁸ App. A at 7 ¶17.

¹⁹ App. A at 7 ¶18.

Clause, or alternatively, seeking just compensation from FWS and Brittain County’s alleged violation of the Fifth Amendment.²⁰ After a seven-day bench trial, the District Court entered judgment dismissing Lear’s claim that the ESA is an unconstitutional exercise of legislative power as applied to her property but awarding damages in Lear’s favor of \$10,000 against FWS and \$90,000 against Brittain County for unconstitutional takings of her property in violation of the Fifth Amendment to the Constitution.²¹

Following the issuance of the District Court, FWS and Brittain County each filed a Notice of Appeal on June 9, 2016. Plaintiff filed a Notice of Appeal on June 10, 2016.²²

SUMMARY OF ARGUMENT

Because the take regulation under the Endangered Species Act (“ESA”) substantially affects interstate commerce, the ESA is a valid exercise of congressional power under the Interstate Commerce Clause. Since the ESA itself is a comprehensive regulatory scheme, the court can consider the aggregate effect that takes have on interstate commerce. The regulated activity here—takes of endangered species—prohibits such economic activities as residential and commercial development. Congress had emphasized the preservation of genetic diversity and restoration of species’ population for future exploitation as essential goals for the ESA. Because of the economic motivations behind the ESA and the direct impact that takes have on development, the regulated activity here has a substantial connection to interstate commerce.

Because Plaintiff did not exhaust all administrative remedies when pursuing the ITP, Plaintiff’s takings claim is not ripe against FWS. A party applying for a permit from a government entity must obtain a final decision from the government entity for the case to be ripe

²⁰ App. A at 7 ¶18.

²¹ App. A at 4.

²² App. A at 1.

for trial. Plaintiff did not obtain a final decision from FWS. Failing to obtain a final decision from the government agency, there are two narrow exceptions for the case to be ripe for trial: (1) A party need not apply for a permit if it would be a futile act; (2) a party need not apply for a permit if it is so procedurally burdensome as to effectively deprive that party of their rights. Plaintiff cannot avail herself of either exception, because FWS has a policy and history assisting applicants to such a positive extent that futility and overly burdensome procedure are non-issues. As a result, Plaintiff's takings claim against FWS is not ripe for litigation.

Because Lear Island has been mostly treated as a single parcel of land despite its subdivision, the relevant parcel for the taking analysis should be all of Lear Island. Two schools of thought have risen to determine the relevant plot of land for a takings clause: (1) the formulaic approach, and (2) the flexible approach. The formulaic approach should not be adopted because it runs counter to public policy and oversimplifies the facts in a takings case. Instead, the flexible approach should be adopted because it is more adaptable to the fact sensitive inquiries of takings claims using a series of balancing factors. Applying the flexible approach to Plaintiff's case, the factors weigh heavily in favor for the entirety of Lear Island being treated as the relevant parcel.

The Takings Clause of the Fifth Amendment provides that "[N]or shall private property be taken for public use, without just compensation." This includes takings effected by government regulations that go too far, as well as those that require physical intrusion on private property, or those that effect a complete deprivation of economic value of a property. Plaintiff here has alleged a complete deprivation of economic value of her property, but this claim fails for several reasons: the burden by FWS is temporary, Plaintiff possess alternative means of economic enjoyment, Plaintiff never held title to the lake bed under the half-acre cove she proposed filling, and the District Court erred in considering the combined effect of the FWS

regulations and Brittain County Wetlands Preservation Law to find a categorical taking.

Plaintiff did not experience a complete deprivation of economic value of her property, because the Karner blue habitat is naturally temporary, rendering *Lucas* analysis inapposite. A fee simple estate, as Plaintiff possesses in the Cordelia Lot, cannot be rendered valueless by a temporary prohibition on economic use.

Plaintiff has not adequately demonstrated that she has no alternative means of gaining economic benefit from the Cordelia lot. In addition to the availability of renting out the property to the Brittain County Butterfly Society, which may be sufficient to outweigh the artificially high property tax Plaintiff is currently paying on the property, Plaintiff retains the right to dispose of the property to public or private parties that may be interested in it.

In spite of the 1803 congressional grant of Lear Island to the Lear family, the United States, and once admitted to the Union, New Union, retained its title to the lakebed surrounding Lear Island. Initially premised on the States' ability to hold navigable waterways and the land beneath them in trust for future public use, the public trust doctrine has recently been extended to preserving ecological resources, private beaches, and parks. As there was no public urgency or international obligation apparent in the grant, the transfer of the lakebed title violated congressional policy.

Finally, the District Court erred in applying joint tortfeasor doctrine when determining whether or not a complete taking had occurred. This resulted in a paradoxical damage apportionment, and considering both relevant regulations in the claims against both Brittain County and FWS confuses the issue of the relevant denominator for Plaintiff's *Lucas* claims.

ARGUMENT

STANDARD OF REVIEW

The standard of review for questions of law is de novo.²³

I. BECAUSE THE ESA REGULATES ACTIVITY THAT HAS A SUBSTANTIAL EFFECT ON INTERSTATE COMMERCE, THE ESA IS A VALID EXERCISE OF CONGRESS’S COMMERCE POWER.

The plaintiff’s as-applied challenge to the constitutionality of the Endangered Species Act (“ESA”) fails because Congress had a rational basis for deciding that the ESA is substantially related to interstate commerce.²⁴ Enacted in 1973, the ESA seeks to halt the eradication of threatened and endangered species both domestically and internationally by preserving ecosystems and promoting conservation of listed species.²⁵ In order to attain these goals, the ESA prohibits the take of listed species, which includes significant habitat modification.²⁶ Given the substantial effects that takes and preservation of critical habitat have on interstate commerce, there was no plain showing that Congress had overstepped its constitutional limitations.²⁷ Thus, according Congress judicial deference for its legislation, the District Court rightfully upheld the constitutionality of the ESA under the Commerce Clause.²⁸

When deciding whether congressional statutes are appropriately based on the Commerce Clause, the Supreme Court has traditionally focused on three areas of regulated activity,

²³ *Highmark, Inc. v. Allcare Health Mgmt. Sys., Inc.*, 134 S. Ct. 1744, 1748 (2014).

²⁴ *See* U.S. CONST. art. I, § 8, cl. 3; *Gonzales v. Raich*, 545 U.S. 1, 22 (2005) (noting that a court only needs to decide whether Congress had a rational basis for determining whether an activity substantially affected interstate commerce); *Hodel v. Indiana*, 452 U.S. 314, 323 (1981) (holding that a court may only overturn federal law enacted under the Commerce Clause if there is no rational basis for concluding that the regulated activity affects interstate commerce).

²⁵ Endangered Species Act, 16 U.S.C. § 1531(b) (2012).

²⁶ 16 U.S.C. §§ 1532, 1538(a)(1); 50 C.F.R. § 17.3; *Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 515 U.S. 687, 708 (1995).

²⁷ *United States v. Morrison*, 529 U.S. 598, 607 (2000); *see Wickard v. Filburn*, 317 U.S. 111, 123–24 (1942) (noting that activity being regulated does not itself need to be commercial); *Nat’l Ass’n of Home Builders v. Babbitt*, 130 F.3d 1041, 1049 (D.C. Cir. 1997).

²⁸ *Morrison*, 529 U.S. at 607.

including those activities having a substantial relation to interstate commerce.²⁹ If the activity is a part of a larger comprehensive regulatory statute, the court can consider the aggregate of similarly situated activities.³⁰ Any *de minimis* instances of the activity, therefore, are irrelevant.³¹ Rather than assessing the prohibition of land development as it applies specifically to the plaintiff and to this particular intrastate species, the court must instead consider takes, including private land development that jeopardizes critical habitat, of not just Karner blue butterflies but of all endangered species.³²

In determining whether an activity substantially affects interstate commerce, the Supreme Court in *United States v. Lopez* outlined four factors.³³ First, the court should consider the economic nature of the intrastate activity.³⁴ Although takes may not be directly economic in nature, they are part of a larger regulatory statute that has economic motives.³⁵ These motives include preventing poaching or the interstate trade of endangered species; protecting the as yet unknown commercial value of species; encouraging regeneration of species to numbers at which they can be safely exploited for their commercial value; preserving genetic diversity, which can contribute to pharmaceutical discoveries; preserving ecosystems so that other dependent species

²⁹ *Gonzales v. Raich*, 545 U.S. 1, 16–17 (2005); *see Wickard*, 317 U.S. at 123–24.

³⁰ *Raich*, 545 U.S. at 17; *Wickard*, 317 U.S. at 127–28.

³¹ *Raich*, 545 U.S. at 17; *see also* *Markle Interests, LLC v. U.S. Fish & Wildlife Serv.*, 827 F.3d 452, 477 (5th Cir. 2016) (noting that considering species individually rather than in aggregate would result in “piecemeal extinctions”).

³² *Wickard*, 317 U.S. at 127–28.

³³ 514 U.S. 549, 559–67 (1995). The Court in *Lopez* and *Morrison* included jurisdictional elements as one of the four factors, but as the ESA does not have a jurisdictional element, that is not applicable here. *Morrison*, 529 U.S. at 611–12; *Lopez*, 514 U.S. at 561–62; *Rancho Viejo v. Norton*, 323 F.3d 1062, 1068 (D.C. Cir. 2003). Even without the jurisdictional element, the ESA can still be upheld under the Commerce Clause if it sufficiently meets the other factors. *See Morrison*, 529 U.S. at 613.

³⁴ *Lopez*, 514 U.S. at 559.

³⁵ *San Luis & Delta-Mendota Water Auth. v. Salazar*, 638 F.3d 1163, 1176 (9th Cir. 2011); *GDF Realty Invs., Ltd. v. Norton*, 326 F.3d 622, 639 (5th Cir. 2003).

do not become threatened as well; and enabling recreational and scientific observation of the species which may entail interstate travel.³⁶ Overall, the ESA protects and rehabilitates endangered species because they are valuable resources economically, ecologically, aesthetically, and scientifically.³⁷ By providing a uniform set of regulations, the ESA also prevents a race to the bottom among states that the Supreme Court has noted is a valid economic concern.³⁸

Additionally, by regulating takings in this instance, the ESA is preventing the very type of economic activity—land development—that accounts for so much species loss.³⁹ Prohibiting takes, including habitat degradation, impacts commercial activities that can have interstate features.⁴⁰ The D.C. Circuit in *Rancho Viejo v. Norton* emphasized the commerciality of land development when it concluded that regulating the construction of the housing development

³⁶ *San Luis & Delta-Mendota Water Auth.*, 638 F.3d at 1176; *Nat’l Ass’n of Home Builders v. Babbitt*, 130 F.3d 1041, 1052 (D.C. Cir. 1997) (explaining “option value” of endangered species because of their potential use as resources).

³⁷ Endangered Species Act, 16 U.S.C. § 1531(a)(3) (2012); *Gibbs v. Babbitt*, 214 F.3d 483, 492 (4th Cir. 2000); *see also* *Alabama-Tombigbee Rivers Coal. v. Kempthorne*, 477 F.3d 1250, 1275 (11th Cir. 2007) (“Because Congress could not anticipate which species might have undiscoverable scientific and economic value, it made sense to protect all those species that are endangered.”).

³⁸ H.R. REP. NO. 93-415, at 144 (1973) (acknowledging importance of uniformity because “series of unconnected and disorganized policies and programs by various states might well be confusion compounded”); *Gibbs*, 214 F.3d at 496; *see* *Hodel v. Virginia Surface Mining & Reclamation Ass’n*, 452 U.S. 264, 281–82 (1981) (commenting that Congress must act to prevent “destructive interstate competition”).

³⁹ H.R. REP. NO. 93-412, at 141; S. REP. NO. 91-526, at 2 (1969), *as reprinted in* 1969 U.S.C.C.A.N. 1413, 1414; *see* 16 U.S.C. § 1533(a)(1) (listing habitat destruction first as possible reasons for considering a species endangered); U.S. FISH & WILDLIFE SERV., KARNER BLUE BUTTERFLY RECOVERY PLAN 13 (2003) (noting that loss of lupine, upon which Karner Blue butterflies rely, is due to “housing, retail, light industrial, and agricultural development”); *GDF Realty Invs., Ltd.*, 326 F.3d at 639.

⁴⁰ *Rancho Viejo v. Norton*, 323 F.3d 1062, 1068 (D.C. Cir. 2003); *see also* *Markle Interests, LLC v. U.S. Fish & Wildlife Serv.*, 827 F.3d 452, 477 (5th Cir. 2016) (“[H]abitat protection and management—which often intersect with commercial development—underscore the economic nature of the ESA and its critical-habitat provision.”).

would have a direct impact on interstate commerce.⁴¹ Considered alone, the construction of a single-family residence may not seem significant, but as seen in the aggregate, property development for commercial and residential purposes are main reasons for species loss.⁴²

For the second *Lopez* factor, the court considers any congressional findings that have illustrated the regulated activity's economic purpose.⁴³ The congressional reports released prior to the ESA's enactment mention two economic motivations.⁴⁴ In 1969, the Senate considered regeneration to the point of renewed commercial exploitation and fear of losing invaluable distinctive genetic material to be pragmatic justifications for the ESA.⁴⁵ In 1973, the House of Representatives reiterated these reasons, noting that the "value of this genetic heritage is, quite literally, incalculable" and that "sheer interest compels us to be cautious."⁴⁶ Thus, the ESA was enacted in order to preserve endangered species primarily for their future genetic and commercial use.⁴⁷

Finally, for the third *Lopez* factor, the court considers the attenuation of the link between the intrastate activity and its effect on interstate commerce.⁴⁸ Given the extent of the activity's effects enumerated for the economic nature factor, the intrastate activity here is significantly connected to interstate commerce.⁴⁹ The court does not have to pile inference upon inference to

⁴¹ *Rancho Viejo*, 323 F.3d at 1068–69.

⁴² *See* 16 U.S.C. § 1531(a)(1) (finding that many fish and wildlife have gone extinct due to unchecked economic growth and development).

⁴³ *United States v. Lopez*, 514 U.S. 549, 562–63 (1995).

⁴⁴ H.R. REP. NO. 93-412, at 143–44; S. REP. NO. 91-526, at 2.

⁴⁵ S. REP. NO. 91-526, at 2.

⁴⁶ H.R. REP. NO. 93-412, at 143–44.

⁴⁷ *Id.*; S. REP. NO. 91-526, at 2.

⁴⁸ *United States v. Morrison*, 529 U.S. 598, 612 (2000); *Lopez*, 514 U.S. at 566.

⁴⁹ *See supra* notes 34–42 and accompanying text. Furthermore, in enumerating its regulated activities, the ESA is limited in scope and is not a general police power. *See* Endangered Species Act, 16 U.S.C. § 1538(a)(1) (2012); *Lopez*, 514 U.S. at 567; *Gibbs v. Babbitt*, 214 F.3d 483, 503 (4th Cir. 2000) (holding that ESA is not limitless congressional power).

see that the ESA is rooted in economic factors, including preserving species for commercial exploitation, and directly regulates commercial activities, including real estate development, by prohibiting takes.⁵⁰ Thus, Congress had a rational basis for determining that the ESA substantially affects interstate commerce.⁵¹

II. PLAINTIFF DID NOT EXPERIENCE A COMPLETE DEPRIVATION OF ECONOMIC VALUE OF HER PROPERTY, BECAUSE OF THE IMPERMANENT NATURE OF ANY REGULATORY TAKING, THE AVAILABILITY TO PLAINTIFF OF ALTERNATIVE METHODS OF GAINING ECONOMIC BENEFIT, AND THE INSUFFICIENCY OF EITHER FWS OR BRITAIN COUNTY REGULATIONS, STANDING ALONE, IN RENDERING THE CORDELIA LOT DEVOID OF ALL ECONOMIC VALUE.⁵²

The Takings Clause of the Fifth Amendment provides that “[N]or shall private property be taken for public use, without just compensation.⁵³ Prior to *Pennsylvania Co. v. Mahon*, the protection of the Takings Clause extended only against a direct appropriation of property, but afterwards it was extended to require a compensation for a “regulatory taking,” a restriction on property that went “too far.”⁵⁴ In 1978, *Penn Central Transportation Co. v. New York City* clarified that the test for how far was “too far” requires an “ad hoc” factual inquiry.⁵⁵ This inquiry considers factors such as the economic impact of the regulation in question, the regulation’s interference with reasonable investment-backed expectations, and the character of

⁵⁰ *Lopez*, 514 U.S. at 567; see 16 U.S.C. § 1531(a)(1); H.R. REP. NO. 93-412, at 143.

⁵¹ See *Gibbs*, 214 F.3d at 496 (holding that Congress had reasonable basis for wanting to protect scarce natural resources).

⁵² This section assumes for the sake of argument that the relevant parcel is the Cordelia Lot, as directed by issues 4–7 in the Twelfth Circuit’s Order of September 1, 2016. FWS does not mean to waive its arguments, as detailed above, that the relevant parcel is the entirety of Lear Island.

⁵³ U.S. CONST. amend. V. The Fifth Amendment has been incorporated against the states by the Due Process Clause of the Fourteenth Amendment. See *Chicago, B. & Q.R. Co. v. City of Chi.*, 166 U.S. 226 (1897).

⁵⁴ *Horne v. Dep’t. of Agric.*, 135 S. Ct. 2419 (2015) (citing *Pennsylvania Coal Co. v. Mahon*, 260 U.S. 393 (1922)).

⁵⁵ 438 U.S. 104, 124 (1978).

the government action.⁵⁶ Government regulations that include actual physical appropriation,⁵⁷ along with those extraordinary cases “when the owner of real property has been called upon to sacrifice *all* economically beneficial uses in the name of the common good, that is, to leave his property economically idle” result in a categorical taking without regard to the *Penn Central* factors.⁵⁸ Here, the District Court engaged in no *Penn Central* analysis, but rather found a complete deprivation of economic benefit that resulted in a categorical taking under *Lucas*.⁵⁹ This finding is incorrect because of the temporary nature of the ESA burden on the Cordelia Lot and the availability to Plaintiff of economic uses of her property other than her proposed use of building a residence, and because the Court inappropriately considered the combined effect of the ESA And local Brittain County wetland law when determining complete economic deprivation.

A. Because Plaintiff Did Not Exhaust Her Administrative Remedies, Plaintiff’s Takings Claim Is Not Ripe.

The District Court erred when it decided that Plaintiff’s takings claim against FWS was ripe for litigation. *Williamson County Regional Planning Commission v. Hamilton Bank*, the controlling case for ripeness for regulatory takings, holds that a party applying for a permit from a government entity must obtain a final decision from the government entity for the case to be ripe for trial.⁶⁰ Waiting for a final decision obviates the need for courts to unnecessarily address

⁵⁶ *Id.*

⁵⁷ *See, e.g.* *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 426–35 (1982) (holding that a taking had occurred, without applying *Penn Central* factors, where regulation required owner of apartment building to allow installation of cable box on her rooftop.)

⁵⁸ *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1019 (1992).

⁵⁹ *See id.*

⁶⁰ 473 U.S. 172, 186 (1985) (noting that a regulatory taking is not ripe until the government entity charged with implementing the regulations has reached a final decision regarding the application for the regulations to the property at issue); *see also* *Morris v. United States*, 392 F.3d 1372, 1376 (Fed. Cir. 2004).

constitutional questions when administrative solutions exist.⁶¹

There are two narrow exceptions to the broad requirement in *Williamson* that a final administrative decision be reached for ripeness.⁶² First, a final administrative decision need not be reached to find ripeness first if an applicant would be required to perform a futile act when the government entity has already articulated a policy of denying the very sort of permit the claimant would need.⁶³ Second, a final administrative decision need not be reached if an applicant would be required to apply for a permit with so burdensome a procedure as to effectively deprive the applicant of his or her rights.⁶⁴

The District Court erred in its ruling that FWS interpreted its own regulations such that it would be futile for Plaintiff to apply for—and subsequently be granted—an Incidental Take Permit (“ITP”).⁶⁵ FWS merely included possibilities for a HCP in its two communications with Plaintiff, and at no point indicated that its suggestions were requirements.⁶⁶ Had Plaintiff satisfied her burden of exhausting administrative remedies, she would have discovered that

⁶¹ See *Williamson*, 473 U.S. at 186 (citing *Hodel v. Virginia Surface Mining & Reclamation Ass’n*, 452 U.S. 264 (1981)).

⁶² See *id.*

⁶³ *Palazzolo v. Rhode Island*, 533 U.S. 606, 626 (2001) (articulating if a government agency interprets its own regulations to deny a certain permit the applicant needs, then it becomes clear that the government entity “lacks the discretion to permit any development...[and] a takings claim is likely to have ripened”).

⁶⁴ *Hage v. United States*, 35 Fed. Cl. 147, 164 (Fed. Cl. 1996) (articulating that that an applicant “need not apply for a permit [to demonstrate ripeness] if plaintiffs can establish that the procedure to acquire a permit is so burdensome as to effectively deprive plaintiffs of their property rights”).

⁶⁵ 16 U.S.C. § 1539(a)(1)(B); see *Palazzolo*, 533 U.S. at 626.

⁶⁶ See App. A. at 6–7 ¶14. In the first communication, Plaintiff contacted FWS to inquire what permits would be needed to build on her lot. FWS informed Plaintiff that her lot was a critical habitat for the Karner blue and that it would require an ITP and a habitat conservation plan (“HCP”) to develop. FWS also included what an ITP and a HCP would entail. The second communication was a letter addressed to Plaintiff by FWS. In the second communication, FWS invited Plaintiff to apply for an ITP and HCP and included some of the *minimum* requirements for *one* type of HCP. See *id.*

developing a HCP was far from futile.

Plaintiff limited herself to a narrow interpretation of the HCP, but there were other possible mitigation measures which could have been employed.⁶⁷ Plaintiff could have compensated for the impact through translocation by removing the Karner blue from a project area and placing them into suitable protected habitat that has been enhanced or restored.⁶⁸ Translocation is not only a feasible alternative for the Karner blue butterfly, but a plan which is being implemented successfully throughout the country, namely in Ohio.⁶⁹ Ohio's recovery teams are so effective at transporting the Karner blue butterfly that they have maintained a 100% survival rate for collection and transport.⁷⁰ The feasibility of alternative HCPs, as evidenced by Ohio's conservation effort for the Karner blue, distinguishes Plaintiff's case from *Palazzolo*.⁷¹ Given the existence of alternative HCPs, this court should rule that the case was not sufficiently ripe based on Plaintiff's futility to apply.

The District Court erred when it ruled that it would have been futile for plaintiff to apply for a permit due to cost. Central to the District Court's ruling was that an "application for a permit would be futile where it is *undisputed* that the cost of applying for a permit exceeds the fair value of the property in question" relying on a self-serving quote from Plaintiff's

⁶⁷ U.S. FISH & WILDLIFE SERV., HABITAT CONSERVATION PLANNING AND INCIDENTAL TAKE PERMIT PROCESSING HANDBOOK at 3-19 to 3-20 (1996).

⁶⁸ *Id.*

⁶⁹ U.S. FISH & WILDLIFE SERV., KARNER BLUE BUTTERFLY RECOVERY PLAN 7-11 (2003); *see generally* Ohio Karner Blue Butterfly Recovery Team, *Ohio Conservation Plan - 2012-2022* (2012) (attached hereto as Appendix B) [hereinafter App. B].

⁷⁰ App. B. at 13 (noting that the Ohio Karner Blue Recovery Team is so effective that it plans to establish more than five new populations of Karner blue butterflies throughout the state).

⁷¹ *See Palazzolo v. Rhode Island*, 533 U.S. 606, 626 (2001) (noting that ripeness was found when a plaintiff was unable to further clarify their options by applying for a permit). This case is distinguished from *Palazzolo* because Plaintiff could have availed herself of a reasonable, alternative HCP. *See id.*

environmental consultant of \$150,000.00.⁷² The involved role FWS has during the application process implies that costs can vary depending on FWS's degree of participation; especially since FWS' offices are strongly recommended to provide technical assistance to the applicant and to have an involved role with the applicant for filing an ITP, it is entirely possible the cost of the application could have been reduced.⁷³ Given that FWS's involvement could range from limited assistance, to drafting an entire HCP on behalf of the applicant, there is insufficient information to determine the cost—and futility—of applying for an ITP and HCP.⁷⁴

The District Court erred when it ruled that applying for a permit would be so burdensome as to effectively deprive Plaintiff of her property rights. This case can be distinguished from *Hage* because FWS has a much greater degree of flexibility to render assistance to applicants than the agency in *Hage*.⁷⁵ Instead, the instant case is more similar to *Lakewood Associates v. United States*, where the plaintiff's case was not ripe due to burdensome procedure.⁷⁶ In *Lakewood*, the plaintiff did not submit an application to the Army Corps of Engineers (“the Corps”) for the development of plaintiff's land, citing that it was overly burdensome and effectively deprived him of property rights.⁷⁷ The court was not persuaded and countered that the Corps was neither seeing unwarranted information nor causing unique problems for the plaintiff

⁷² App. A. at 9 ¶A, 6 ¶13.

⁷³ U.S. FISH & WILDLIFE SERV., *supra* note 67, at 3-3 to 3-5; *see also* Notice of Availability Construction of Single-Family Home in Fairfax Virginia, 66 Fed. Reg. 32959,32959 (June 19, 2001) [hereinafter Notice of Availability] (noting that FWS has gone as far as draft an entire HCP on behalf of an applicant because it was more cost effective).The court in *Morris* notes that FWS is strongly compelled in the *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (“HCPH”) to render assistance to applicants, which makes the cost difficult to determine. 392 F.3d 1372, 1377 (Fed. Cir. 2004). The court pressed “[t]he assumption that the cost off plying for the ITP is fixed and knowable is simply incorrect.” *Id.*

⁷⁴ *See Morris*, 392 F.3d at 1377; Notice of Availability, *supra* note 73.

⁷⁵ *See* 35 Fed. Cl. 147 (Fed. Cl. 1996).

⁷⁶ 45 Fed. Cl. 320, 333–34 (Fed. Cl. 1999).

⁷⁷ *See id.*

through its application.⁷⁸ Similar to the Corps in *Lakewood*, FWS in the instant case did not require Plaintiff to submit any information which was above and beyond what is normally required, nor information that was unwarranted or which would cause problems unique to Plaintiff.⁷⁹ Furthermore, FWS has discretion and is encouraged to assist applicants in the technical matters of their applications, further clouding the exact burden that Plaintiff must bear.⁸⁰ Courts look positively on an agencies willingness to assist the applicant in filing an application to determine if the application is overly burdensome.⁸¹

Given case law and evidence on the record, the court should find that there is insufficient evidence that an application for an ITP, and instead rule that Plaintiff's case was not sufficient to litigate a takings claim against FWS.

B. Because Lear Island Has Consistently Been Treated As A Single Parcel Of Land, The Relevant Parcel For The Takings Analysis Should Be All Of Lear Island.

The District erred when it ruled the relevant parcel for the takings analysis was the Cordelia Lot and not all of Lear Island. Determining the relevant plot of land for a takings case is known commonly as the “denominator question.”⁸² The denominator question was thoroughly discussed in *Lucas v. South Carolina Coastal Council*, relative to the creation of the “categorical

⁷⁸ *See id.*

⁷⁹ *See id.*; App. A at 6.

⁸⁰ *See* U.S. FISH & WILDLIFE SERV., *supra* note 67, at 3-3 to 3-5 (noting that FWS is encouraged in its handbook to collaborate with the applicant to develop the best strategy for the HCP that will meet permit issuance criteria); *Morris v. United States*, 392 F.3d 1372, 1377 (Fed. Cir. 2004).

⁸¹ *See Robbins v. United States*, 40 Fed. Cl. 381, 387-88 (Fed. Cl. 1998) (noting an application was not overly burdensome due to the Army Corps of Engineers' willingness to assist the applicant in preparing and developing a permit).

⁸² *See Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1054 (1992).

rule.”⁸³ While the categorical rule is straightforward, it is limited and does not shed light on how to define the relevant parcel.⁸⁴ Since *Lucas*, the lower courts have struggled to find a uniform approach to the denominator question.⁸⁵

The court should reject the formulaic approach that the District Court adopted when it determined that Cordelia’s lot was the relevant parcel. The District Court ruled that “formal subdivisions of a property into separate lots should be determinative.”⁸⁶ This runs against public policy, as formal subdivisions being the determinate factor can create perverse incentives for developers.⁸⁷ In *Lucas*, Justice Stevens raised the possibility of developers manipulating parcels to smaller sizes to increase the likelihood that a takings would categorically wipe out their value.⁸⁸ Justice Scalia admitted in the majority that “the rhetorical force of our ‘deprivation of all economically feasible use’ rule is greater than its precision, since the rule does not make clear the ‘property interest’ against which the loss of value is to be measured.”⁸⁹ The formulaic approach also risks relying on an unnecessarily simplified view of the facts.⁹⁰

The court should instead adopt the “flexible approach,” which originated in *Loveladies*

⁸³ *Id.* at 1019 (stating when the owner of real property has been called upon to sacrifice *all* economically beneficial uses in the name of the common good, that is, to leave his property economically idle, he has suffered a taking).

⁸⁴ *See id.*

⁸⁵ *See e.g.* *Brace v. United States*, 72 Fed. Cl. 337, 348 (Fed. Cl. 2006); *Cane Tenn., Inc. v. United States*, 62 Fed. Cl. 703, 709 (Fed. Cl. 2004); *Lost Tree Vill. Corp. v. United States*, 92 Fed. Cl. 711, 718 (Fed. Cl. 2010); App. A. at 9–10 ¶B.

⁸⁶ App. A. at 9–10 ¶B.

⁸⁷ *Lucas*, 505 U.S. at 1016 n.7.

⁸⁸ *See id.* at 106–66 (Stevens, J. dissenting).

⁸⁹ *See Lucas*, 505 U.S. at 1016 n.7.

⁹⁰ *See Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124 (1978) (noting that determining the nature and extent of the interference with rights in the parcel as a whole is an important inquiry for a takings analysis).

Harbor, Inc. v. United States.⁹¹ The Federal Claims Court has since developed a robust series of factors to assist in determining how to define the regulated property, or denominator, for purposes of the relevant parcel.⁹² Relevant factors for the instant case are: (1) the degree of contiguity between property interests; (2) the dates of acquisition of property interests; and (3) the extent to which a parcel has been treated as a single unit.⁹³ These factors are weighed by a totality of the evidence, with no single factor taking precedence over another.⁹⁴ By adopting a flexible approach, courts are better able to adapt their reasoning to fact sensitive situations in a way that is consistent with Supreme Court jurisprudence.⁹⁵ When the factors are applied to the instant case, it is clear that the weight of evidence supports classifying the entirety of Lear Island as the relevant parcel for the takings analysis.

Given the degree of contiguity between the Cordelia Lot and the rest of Lear Island, there is sufficient contiguity between Cordelia's lot and the rest of Lear Island to weigh in favor of treating all of Lear Island as the relevant parcel.⁹⁶ This is evidenced by the Cordelia Lot being connected to the rest of the island by an access strip that is forty feet wide by 1,000 feet long

⁹¹ 28 F.3d 1171, 1181 (Fed Cir. 1994) (noting that the Federal Circuit reasoned a new approach was needed to take into account factual nuances surrounding inquiries into substantial economically viable uses for property after regulatory imposition).

⁹² See *Lost Tree Vill. Corp.*, 92 Fed. Cl. at 718; *Cane Tenn., Inc.*, 62 Fed. Cl. at 709.

⁹³ See *Lost Tree Vill. Corp.*, 92 Fed. Cl. at 718; *Cane Tenn., Inc.*, 62 Fed. Cl. at 709. Note that this is not an exhaustive list of factors. See *Lost Tree Vill. Corp.*, 92 Fed. Cl. at 718.

⁹⁴ See *Lost Tree Vill. Corp.*, 92 Fed. Cl. at 718 (noting that singular factors can be close to determinative if there is enough evidence supporting them).

⁹⁵ See *Palazzolo v. Rhode Island*, 533 U.S. 606, 646 (2001) (O'Connor, J., concurring) (“[T]he temptation to adopt what amount to per se rules in either direction must be resisted... The Takings Clause requires careful examination and weight of all the relevant circumstances in this context”); see also *Bass Enters. Prod. Co. v. United States*, 381 F.3d 1360, 1369 (Fed. Cir. 2004).

⁹⁶ See *Brace v. United States*, 72 Fed. Cl. 337, 348 (Fed. Cl. 2006). The first factor weighs the degree of contiguity between property interests to determine how closely integrated the properties in question are with each other. The more integrated the properties are, the more likely contiguity will be found. See *id.*

serving as a means of connecting the northern part of the island to the rest of the island for agricultural purposes.⁹⁷ In addition, the Cordelia Lot directly borders the Goneril lot.⁹⁸

Given that the entirety of Lear Island has always been deeded away simultaneously, the dates of acquisition of the property interest weigh in favor of treating all of Lear Island as the relevant parcel.⁹⁹ The three parcels of land which comprised Lear Island were deeded to the sisters in a simultaneous conveyance upon King James Lear's death in 2005.¹⁰⁰ The Federal Circuit has found that property which is conveyed simultaneously should weigh for the relevant parcel being treated as a whole.¹⁰¹ Moreover, all three lots of land were deeded to Cornelius Lear as a whole parcel in 1803.¹⁰²

The extent to which Lear Island has been historically treated as a single economic unit weighs heavily in favor of treating the relevant parcel as all of Lear Island.¹⁰³ Lear Island was originally granted to the Lear family in 1803 by an act of Congress.¹⁰⁴ For *162 years*, the Lear family treated the island as a unified economic unit by using it as a homestead, farm, and hunting

⁹⁷ App. A. at 5 ¶5.

⁹⁸ *Id.* at 7 ¶12; *see Brace*, 72 Fed. Cl. at 348 (noting where parcels subdivided land were similarly bordering each other and were integrated by common infrastructure).

⁹⁹ *See Lost Tree Vill. Corp.*, 92 Fed. Cl. at 718. The second factor insures that property was not conveyed in a staggered fashion to artificially increase the likelihood of a taking. Conveyances of property that are temporally remote point to the parcel being treated as a whole. *See id.*

¹⁰⁰ App. A. at 5 ¶4.

¹⁰¹ *See Palm Beach Isles Assocs. v. United States*, 231 F.3d 1354, 1381 (Fed. Cir. 2000) (noting that property which was conveyed in different transactions separated temporarily evidenced treating the relevant parcel as a denominator); *Lost Tree Vill. Corp.*, 92 Fed. Cl. at 718 (noting that property which was physically adjacent but temporally remote evidenced treating the relevant parcel as a denominator).

¹⁰² App. A. at 1–2.

¹⁰³ *Cane Tenn., Inc. v. United States*, 62 Fed. Cl. 703, 709 (Fed. Cl. 2004). The third factor's purpose is to determine the degree of economic integration that the properties in question have with each other. The greater the extent of economic integration, the more heavily evidence weighs that the parcel should be treated as a whole. *See id.*

¹⁰⁴ App. A. at 4 ¶1.

and fishing grounds.¹⁰⁵ When King Lear inherited the island and subdivided it in 1965, he continued to use the entire island as a single unit by constructing a house on one lot while living on another.¹⁰⁶ The first time Lear Island was not treated as a single unit was in 2005, when his passing divided the land.¹⁰⁷ Given that Lear Island was treated as a single unit from 1803 until 2005 as both an island-wide agricultural farm operation and as King Lear’s personal development lot, all of Lear Island should be treated as the relevant parcel.

These three factors weigh heavily enough that the Court should rule that all of Lear Island, not Cordelia’s lot, should be treated as the relevant parcel, the takings analysis.¹⁰⁸

C. In Light Of The Naturally Temporary Nature Of The Butterfly Habitat, The District Court’s Finding Of A Regulatory Taking Based On Complete Deprivation Of Economic Value Was Incorrect.

Considering the naturally temporary nature of the Karner blue habitat, the burden on the Cordelia Lot generated by the ESA’s implementing regulations protecting the Karner blue habitat is itself fundamentally temporary, thus rendering inapposite the categorical *Lucas* rule that a taking occurs when an individual has experienced complete, permanent deprivation of economic value.¹⁰⁹

A finding of complete economic deprivation would be inappropriate here for essentially the same reasons expressed in *Tahoe-Sierra* because, as in *Tahoe-Sierra*, there has not been an

¹⁰⁵ See *id.* at 5 ¶2.

¹⁰⁶ See *id.*

¹⁰⁷ See *id.*

¹⁰⁸ See *Lost Tree Vill. Corp. v. United States*, 92 Fed. Cl. 711, 718 (Fed. Cl. 2010) (noting that not all of the factors need to be utilized to determine the relevant parcel so long as there is sufficient evidence to make a determination).

¹⁰⁹ See *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg’l Planning Agency*, 535 U.S. 302, 330–32 (2002); *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1019 (1992); App. A at 7 ¶15 (“[W]ithout annual mowing, the lupine fields on the Cordelia Lot would naturally convert to a successional forest of oak and hickory trees, eliminating that Karner blues’ habitat.”)

“unconditional and permanent” taking.¹¹⁰ In *Tahoe-Sierra*, several development moratoria resulted in the plaintiff’s inability to develop property near Lake Tahoe for a period of 32 months.¹¹¹ The District Court held that the petitioners had been temporarily deprived of all economically viable use of their land, and that the government’s actions constituted a categorical taking under *Lucas*.¹¹² The Appeals Court reversed, and the Supreme Court affirmed the Appeals Court, holding that because the regulations in question had only a temporary impact on petitioners’ fee interest in their property, no categorical taking had occurred.¹¹³ Specifically, the Supreme Court held that:

“[a]n interest in real property is defined by the metes and bounds that describe its geographic dimensions and the term of years that describes the temporal aspect of the owner’s interest. Both dimensions must be considered if the interest is to be viewed in its entirety. Hence, a permanent deprivation of the owner’s use of the entire area is a taking of ‘the parcel as a whole,’ whereas a temporary restriction that merely causes a diminution of value is not. Logically, a fee simple estate cannot be rendered valueless by a temporary prohibition on economic use, because the property will recover value as soon as the prohibition is lifted.”¹¹⁴

Here, Plaintiff’s economic enjoyment of the Cordelia Lot is burdened by the ESA only as a temporary result of its native sub-population of Karner blue butterflies. Because, in the absence of Plaintiff’s maintenance of the butterfly population through mowing, the habitat is expected to naturally disappear and the butterfly population is expected to naturally wane, the burden on the Cordelia Lot is temporary, and cannot be held to result in a taking that is unconditional and

¹¹⁰ See 535 U.S. at 302, 330 (citing *Lucas*, 505 U.S. at 1012).

¹¹¹ *Id.* at 306.

¹¹² *Id.* at 316. It is important to note that the District Court there also ruled that there would be no taking under *Penn Central* because of the importance of the government interests in question. See *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg’l Planning Agency*, 34 F. Supp. 2d 1226 (D. Nev. 1999), *rev’d* 216 F.3d 764 (9th Cir. 2000), *aff’d* 535 U.S. 302 (2002).

¹¹³ See *Tahoe-Sierra*, 535 U.S. at 318–21 (citing *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg’l Planning Agency*, 216 F.3d 764, 773–74 (9th Cir. 2000), *aff’d* 535 U.S. 302 (2002)).

¹¹⁴ *Tahoe-Sierra*, 535 U.S. at 332.

permanent.¹¹⁵ If Plaintiff were to allow the natural growth of succession forest, her property would begin to recover value.¹¹⁶ Furthermore, to conclude that Plaintiff has suffered a complete deprivation based on her inability to build a single-family residential home during one temporal slice would be inconsistent with the general rule that regulatory taking jurisprudence considers the whole parcel, and “does not divide a single parcel into discrete segments and attempt to determine whether rights in a particular segment have been entirely abrogated.”¹¹⁷

Tahoe-Sierra noted that it would be inappropriate to establish a *per se* rule stating either that temporary restrictions effect takings “always” or “never,” but rather that the circumstances of a given case determine whether a taking has taken place, specifically within the *Penn Central* framework.¹¹⁸ More telling, and in direct contradiction to the opinion of the District Court here, the *Tahoe-Sierra* court stated that “[I]t is worth emphasizing that we do not reject a categorical rule in this case because a 32-month moratorium is just not that harsh. Instead, we reject a categorical rule because we conclude that the *Penn Central* framework adequately directs the inquiry to the proper considerations – only one of which is the length of the delay.¹¹⁹ However, the Court below apparently held that, based merely upon the fact that the temporary restriction on Plaintiff’s property would last ten years, application of the *Lucas* rule was appropriate.^{120,121}

¹¹⁵ See *Lucas*, 505 U.S. at 1012.

¹¹⁶ The Court below noted the “irony of the FWS relying on the prospective extinction of the very subpopulation of Karner blues it is fighting to protect as an argument against finding a taking of Plaintiff’s property.” App. A at 10. While FWS’ position may appear ironic to the Court below, *Tahoe-Sierra* stands for the proposition that temporary takings are not complete deprivations as contemplated by *Lucas*. FWS does not advocate that Plaintiff allow the Karner blue habitat to disappear, but, nonetheless, the fact that such an option is available renders the burden temporary, rather than permanent, making *Penn Central* analysis essential.

¹¹⁷ *Penn Cent.*, 438 U.S. at 130; see also *Concrete Pipe & Prods. v. Constr. Laborers Pension Trust*, 508 U.S. 602, 644 (1993).

¹¹⁸ See *Tahoe-Sierra*, 535 U.S. at 321, 335–36.

¹¹⁹ *Id.* at 338 n. 34.

¹²⁰ App. A at 10-12.

When considering the ten-year period found by the District Court here, it is worth noting that the Court made no finding as to the nature of the growth of the successional forest: it does not state whether on ten-years-and-one-day the Lot would suddenly become useable in its entirety, or if it would be a more gradual process, with areas of the ten-acre lot becoming uninhabitable by Karner blues, and therefore useable by Plaintiff, piece-by-piece, with the last of the Karner blue habitat disappearing around year ten. This sort of determination, with its obvious relevance to the duration of the restriction on the property, would be relevant to a *Penn Central* analysis, but, unfortunately, the Court did not explicitly address any *Penn Central* factors other than duration, nor did it appear to base its conclusions of law on the *Penn Central*-required ad hoc factual inquiry, which normally would include the economic impact of FWS' regulations, those regulations' interference with Plaintiff's reasonable investment-backed expectations, and the character of the government action.¹²² To the contrary, the Court below cites *Lucas*, not *Penn Central*, in the last paragraph of its opinion, as it incorrectly holds Plaintiff was deprived of all economic use of her property.¹²³

D. In The Face Of Alternative Methods Of Gaining Economic Benefit From The Property Aside From Construction Of A Single-Family Residence, Plaintiff Has Not Experienced A Complete Deprivation Of Economic Value.

The District Court's findings here are insufficient to support a finding that there is no economically viable use for the Cordelia Lot. The total of Judge Remus' findings regarding possible economic uses of the Cordelia Lot can be summarized as follows: there is no market in

¹²¹ It is possible the Court below took FWS' argument to be that the temporary nature of the Karner blue habitat precludes *any* takings claim by Plaintiff; that is not FWS' position. It may be possible that *Tahoe-Sierra* allows Plaintiff to bring a partial takings claim to be analyzed under *Penn Central*. However, Plaintiff has not brought such a claim, and briefing on such a claim has not been requested here.

¹²² See 438 U.S. at 124.

¹²³ See *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992); *Penn Cent.*, 438 U.S. at 124; App. A at 11–12.

Brittain County for the Cordelia Lot for recreational use if a residence cannot be built, there is no market for the property as agricultural or timber land, and the offer by the Brittain County Butterfly Society to pay \$1,000 annually to tour the land during the summer Karner blue season is less than the \$1,500 property tax Plaintiff must pay annually.¹²⁴

While it may be correct that a piece of real property that incurs more in property taxes than it can generate in income is by definition without economic value, there are several problems with the District Court's holding that the Cordelia Lot is such a piece of real property, which are discussed below.¹²⁵ If there is any economically viable use available to Plaintiff, a *Lucas* categorical taking has not occurred, and Plaintiff's claim would be properly analyzed under a *Penn Central* analysis,¹²⁶ which she has chosen to forego.

In analyzing the availability of the uses proposed below, it is important to note the burdens each party carries in a regulatory takings case under *Lucas*: plaintiffs bear the burden of proving each element of their claim, including the absence of any remaining economically viable use, and the plaintiffs' ultimate burden is one of "persuading the court that it is more likely true than not that there remains no economically viable use for their property."¹²⁷ In doing so, a plaintiff is not required to prove a negative, but defendants are permitted to submit evidence and

¹²⁴ App. A at 7 ¶18, 11.

¹²⁵ See *Bowles v. United States*, 31 Fed. Cl. 37 (Fed. Cl. 1994).

¹²⁶ *Tahoe-Sierra*, 535 U.S. at 330 ("A statute that 'wholly eliminated the value' of [plaintiff]'s fee simple title clearly qualified as a taking. But our holding was limited to the 'extraordinary circumstance when *no* productive or economically beneficial use of land is permitted.' The emphasis on the word 'no' in the text of the opinion was, in effect, reiterated in a footnote explaining that the categorical rule would not apply if the diminution in value were 95% instead of 100%. Anything less than a 'complete elimination in value,' or a 'total loss,' the Court acknowledged, would require the kind of analysis applied in *Penn Central*." (internal citations omitted) (citing *Lucas*, 505 U.S. at 1019-20 & 1019 n.8.); see App. A at 8 n.3.

¹²⁷ *Loveladies Harbor, Inc. v. United States*, 21 Ct. Cl. 153, 158 (Ct. Cl. 1990).

argument proposing economically viable uses.¹²⁸ The Court below was bound “to discount proposed economically viable uses that do not meet a showing of reasonable probability that the land is both physically adaptable for such use *and* that there is a demand for such use in the reasonably near future.”¹²⁹

First, Plaintiff retains the right to sell her property to speculators more optimistic than she is about the potential end of the burden on the property, as Karner blue populations, after all, are making progress nationwide.¹³⁰ Alternatively, Plaintiff could sell to investors willing to let natural succession render the land available for a wide variety of uses, including single-family residential, recreational, agricultural, and timber uses. These uses all become available upon natural succession, Karner blue recovery, or establishment of an HCP. There is nothing in the record here to indicate that the current economically restricted state of the Cordelia Lot is going to continue in perpetuity, and to the contrary there are facts indicating that the Lot could become useable.¹³¹ It was inappropriate for the District Court to implicitly conclude that these conditions are going to continue indefinitely and that the Lot has permanently lost all viable economic uses as a result. Even in the face of the current prohibition on economically viable uses, it is incorrect to conclude that there can be no willing buyers.¹³² Speculative future uses, not just the currently

¹²⁸ *Id.*

¹²⁹ *Res Invs., Inc. v. United States*, 85 Fed. Cl. 447, 490 (Fed. Cl. 2009) (citing *Loveladies Harbor*, 21 Ct. Cl. at 158).

¹³⁰ *See generally* U.S. FISH & WILDLIFE SERV. ECOLOGICAL SERVS. FIELD OFFICE, KARNER BLUE BUTTERFLY (*LYCAEIDES MELISSA SAMUELIS*) 5-YEAR REVIEW: SUMMARY AND EVALUATION (2012).

¹³¹ *See* II(C), *supra*.

¹³² *See, e.g., Florida Rock Indus. v. United States*, 791 F.2d 893, 902 (Fed. Cir. 1986) (“We do not perceive any legal reason why a well-informed ‘willing buyer’ might not bet that the prohibition of rock mining, to protect the overlying wetlands, would someday be lifted... There is nothing so certain in life as that all certainties become uncertain, and some are replaced by their opposites. One who invests in land on this faith may be a speculator, but he is not on that account a gull.”).

available uses, are also fairly considered when determining fair market value of a parcel.¹³³

The District Court's finding that there was no market for the Cordelia Lot for recreational use states explicitly that there is "no market *in Brittain County*", but it is not relevant to a determination of complete economic deprivation whether or not prospective buyers are in Brittain County; merely whether or not they exist is sufficient.¹³⁴ The Court made no finding on the availability of prospective recreational buyers in counties outside Brittain, or states outside New Union, nor did the Court make any generalized finding that there are no prospective buyers of any type. As such, there are insufficient factual findings to support a finding of complete economic deprivation based on Plaintiff's inability to dispose of the property or lease it for recreational use.

As another alternative to selling to a private speculator, Plaintiff could sell her property to individuals interested in conserving the population of Karner blues. It is already apparent that there is enthusiasm from people interested in butterflies, as demonstrated by the rental offer by the Brittain County Butterfly Society that Plaintiff rejected. Additionally, FWS' federal conservation plan for the Karner blue includes the possibility of land acquisitions from willing landowners the purpose of conserving existing Karner blue habitat areas, a solution that Plaintiff apparently ignored.¹³⁵ There is nothing in the record here to indicate that Plaintiff made any attempt to find private speculators, conservationists, or government actors willing to purchase the land, or that such buyers do not in fact exist. Instead, there is merely a conclusory statement by

¹³³ *Sierra Club v. Flowers*, 423 F. Supp. 2d 1273, 1301 (S.D.Fla. 2006) (citing *Florida Rock*, 791 F.2d at 903).

¹³⁴ App. A at 7 ¶18 (emphasis added).

¹³⁵ See U.S. FISH & WILDLIFE SERV., *KARNER BLUE BUTTERFLY RECOVERY PLAN 79* (2003) ("Most plans will identify important Karner blue habitat areas which need to be available long-term. This might be accomplished by land acquisition from willing land owners, conservation easements, management agreements, HCPs, or other means."). The New Union Karner blue recovery plan is unfortunately unavailable.

the Court below that there are no recreational buyers available in Brittain County, and no timber or agricultural buyers at all, with no mention of conservationist buyers or other alternatives.

Finally, Plaintiff has not demonstrated that there is no viable economic use for her property on the basis of there not being available income from sources other than the land's disposition. Plaintiff has already been approached by a conservationist group, whose offer she rejected, but she has made no effort to pursue other groups, nor is there any mention in the District Court opinion as to whether or not Plaintiff attempted to negotiate with the Brittain County Butterfly Society.¹³⁶ The Brittain County Butterfly Society offered \$1,000 per year for the privilege of viewing only the summer Karner blue season, but Karner blues lay two cycles of eggs each year, one hatching in spring and one in summer.¹³⁷ There is a second Karner blue season for which Plaintiff could rent the Cordelia Lot, and if she received even half of what the Brittain County Butterfly Society offered, she could be earning as much in rental fees as she is currently paying in property tax. That \$1,500 annual property tax, which the Court below relied on in dismissing the economic viability of renting the Cordelia Lot to butterfly aficionados, is itself based on an outdated valuation, prior to Brittain County's denial of Plaintiff's wetland fill permit.¹³⁸ This property tax is apparently based on the Cordelia Lot's unencumbered fair market value of \$100,000, because Plaintiff has failed to seek reassessment of the Cordelia Lot that would result in a more accurate valuation, and, most likely, lower property tax.¹³⁹ Plaintiff cannot rely on her own failure to have the property reassessed to reap a windfall based on its

¹³⁶ Assuming that the Brittain County Butterfly Society is not included in the Court below's definition of "recreational uses," they must qualify as a conservationist group or something similar.

¹³⁷ See U.S. FISH & WILDLIFE SERV., KARNER BLUE BUTTERFLY FACT SHEET I (2008).

¹³⁸ See App. A at 7 ¶18.

¹³⁹ The Court did not conduct a valuation of the Cordelia Lot, and the relevant provisions of New Union property tax law are unavailable, making it difficult to estimate to what extent an accurate appraisal of the Cordelia Lot would result in a reduced property tax burden.

prior fair market value, as she in fact would most likely not be paying the full \$1,500 going forward, and the Brittain County Butterfly Society's rent could well be sufficient to overcome the property tax and constitute an economically beneficial use.¹⁴⁰ Plaintiff cannot hold herself out as having experienced a complete economic loss when she has rejected the only offer of income that has been made to the Court, particularly where Plaintiff has made no apparent efforts to make any economic gain on the encumbered property, and there exist reasonable alternative methods of recouping some value from her property.

In the face of the numerous avenues Plaintiff has to recoup some value of her property, if not to make ongoing economically beneficial use out of it, the District Court's finding of complete economic deprivation resulting in a *Lucas* categorical taking was profoundly incorrect. As noted in Section II(C), a more appropriate avenue of relief for Plaintiff would have been a *Penn Central* partial taking claim.

E. Although Congress Conveyed Title To Lear Island To Cornelius Lear, The United States, And Once Admitted To The Union, New Union, Retained Title In The Land Underneath Lake Union In Trust For The Public.

In finding that the 1803 congressional grant usurped any state right to the lakebed, the New Union District Court misinterpreted the congressional policy regarding public trust.¹⁴¹ Derived from English common law in which the King held title to public waterways, the public trust doctrine recognizes the public's interest in having access to navigable waterways for

¹⁴⁰ In the absence of Plaintiff making any *Penn Central* claims, any economically beneficial use is sufficient to render inapplicable the *Lucas* categorical takings rule. See *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 330 (2002); *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1019–20 & 1019 n.8 (1992).

¹⁴¹ App. A at 10–11.

purposes of travel and fishing.¹⁴² The doctrine, therefore, prevents private landowners from interfering with the public's right to use such waters.¹⁴³ Furthermore, modern applications of the public trust doctrine have extended the doctrine to protect natural resources that are not purely below the high water mark.¹⁴⁴ Thus, even if the portion of shoreline under which Cordelia Lear hoped to fill for her home was considered non-navigable wetlands and therefore not subject to the traditional public trust doctrine, Brittain County had a duty as a trustee to preserve the wetlands on behalf of the public.¹⁴⁵ Because there was no public exigency or international duty evident in the conveyance of Lear Island, New Union retained title in the lakebed for the benefit of future public use and, therefore, Cordelia had no claim to the land beneath Lake Union.

In 1894, the Supreme Court in *Shively v. Bowlby* noted that the American Revolution resulted in the King's sovereign title in navigable waterways passing to the States who continued to hold the title on behalf of the public.¹⁴⁶ For territories, including the Northwest Territory, the United States held title to such lands beneath navigable waterways until states were created out of the territory.¹⁴⁷ Newly admitted states were held on an equal footing with the original thirteen

¹⁴² *PPL Montana, LLC v. Montana*, 132 S. Ct. 1215, 1226–27, 1234 (2012); *Shively v. Bowlby*, 152 U.S. 1, 11, 58 (1894). These waterways included navigable lakes, such as Lake Union. *Shively*, 152 U.S. at 47.

¹⁴³ *See PPL Montana, LLC*, 132 S. Ct. at 1230; *Shively*, 152 U.S. at 58 (determining that even when private landowners are allowed to construct improvements on navigable waterways, this construction is still subordinate to the public's use).

¹⁴⁴ *Nat'l Audubon Soc'y v. Superior Court of Alpine Cty.*, 33 Cal. 3d 419, 441 (Cal. 1983); *see PPL Montana, LLC*, 132 S. Ct. at 1235 (determining that because public trust is under state jurisdiction, States retain the right to decide the breadth of the public trust doctrine).

¹⁴⁵ *Nat'l Audubon Soc'y*, 33 Cal. 3d at 441; *see Clean Water Act*, 33 U.S.C. § 1251(b) (mandating State's ability to preserve land and water resources); *Rapanos v. United States*, 547 U.S. 715, 777 (2006) (Kennedy, J., concurring) (noting importance to public interest in preserving wetlands).

¹⁴⁶ *Shively*, 152 U.S. at 16; *see Cty. of St. Clair v. Lovington*, 90 U.S. 46, 68 (1874); *Martin v. Waddell's Lessee*, 41 U.S. 367, 410 (1842).

¹⁴⁷ Ordinance of 1787, § 14 art. V, Confederate Cong. (July 13, 1787); *Shively*, 152 U.S. at 49–50; *see Econ. Light & Power Co. v. United States*, 256 U.S. 113, 118 (1921) (noting that the

states and could also claim sovereign title to lands held in trust for the public.¹⁴⁸

In order to prompt settlement of the territory, Congress had the power to convey land above the high water mark to settlers.¹⁴⁹ For land beneath the high watermark, however, Congress abided by the policy that the United States would retain its title in trust for continued public use.¹⁵⁰ Allowing a private party to control land beneath navigable water interferes with the public's interest in having access to public highways.¹⁵¹ States consequently have a genuine interest in retaining title to prevent private parties from interfering with public use and to preserve navigable waterways, such as Lake Union, for travel and commerce.¹⁵²

Rather than granting land beneath navigable water piecemeal to individuals, Congress only diverged from the public trust doctrine when necessary for some public purpose.¹⁵³ The Supreme Court has repeatedly identified those public purposes as public exigency or fulfilling international obligations.¹⁵⁴ Neither public exigency nor international duties, however, existed in the 1803 congressional grant of Lear Island to Cornelius Lear. Instead, Lear Island was solely used for private land ownership.¹⁵⁵ Additionally, since the Northwest Territory's primary existence was for the creation of future states, the United States' hold on the sovereign title of

public interest in navigable waterways in certain Midwestern states originated in the Ordinance of 1787).

¹⁴⁸ Ordinance of 1787, § 14 art. V; *see PPL Montana, LLC*, 132 S. Ct. at 1227.

¹⁴⁹ *Shively*, 152 U.S. at 49; *see Utah Div. of State Lands v. United States*, 482 U.S. 193, 201 (1987).

¹⁵⁰ *Shively*, 152 U.S. at 58.

¹⁵¹ *See PPL Montana LLC*, 132 S. Ct. at 1230 (noting that sovereignty in title to waterways enables states to monitor private and public interests).

¹⁵² *PPL Montana LLC*, 132 S. Ct. at 1226–27, 1230; *Shively*, 152 U.S. at 11.

¹⁵³ *Shively*, 152 U.S. at 58; *see Utah Div. of State Lands*, 482 U.S. at 202 (indicating that congressional intent to defeat a State's interest in title to land beneath high water mark would not be lightly inferred given the importance of public interest).

¹⁵⁴ *Utah Div. of State Lands*, 482 U.S. at 208; *Montana v. United States*, 450 U.S. 544, 551 (1981); *Shively*, 152 U.S. at 58.

¹⁵⁵ App. A at 4–5.

land was always considered temporary.¹⁵⁶ Because Congress had intended to preserve such water as a common highway, therefore, the conveyance of Lear Island for private use violated New Union's right to the title of Lake Union.¹⁵⁷

Whereas the traditional public trust doctrine protected waterways for navigation, commerce, and fishing, the modern doctrine has extended beyond these three justifications.¹⁵⁸ In *National Audubon Society v. Superior Court of Alpine County*, the California Supreme Court determined that the public trust doctrine protected the recreational and ecological values of Mono Lake.¹⁵⁹ In *Matthews v. Bay Head Improvement Ass'n*, the New Jersey Supreme Court upheld the public's ability to access the shoreline despite traversing private property.¹⁶⁰ In *Paepcke v. Public Building Commission of Chicago*, the Illinois Supreme Court considered the public trust doctrine in a dispute over a park.¹⁶¹ As the public trust doctrine has evolved, courts have viewed the United States government, at both the state and federal level, as a trustee with the duty to protect the public's interest in natural resources regardless of whether they are above or below the high water mark.¹⁶² Given the recent expansion in the public trust doctrine and the fact that Congress lacked an appropriate public purpose when conveying the land beneath Lake

¹⁵⁶ Ordinance of 1787, §§ 13–14, art. V, Confederate Cong. (July 13, 1787); see *Shively*, 152 U.S. at 26; *Pollard v. Hagan*, 44 U.S. 212, 221, 223 (1845) (holding that Congress never held a right to soil in Alabama when it existed as a territory “except for temporary purposes”).

¹⁵⁷ See *Econ. Light & Power Co. v. United States*, 256 U.S. 113, 120 (1921) (observing that Ordinance of 1787 was valid legislation that neither the states nor Congress's regulations for purposes of interstate commerce could repeal).

¹⁵⁸ *PPL Montana, LLC v. Montana*, 132 S. Ct. 1215, 1234 (2012); *Shively*, 152 U.S. at 11; *Nat'l Audubon Soc'y v. Superior Court of Alpine Cty.*, 33 Cal. 3d 419, 435 (Cal. 1983).

¹⁵⁹ 33 Cal. 3d at 435.

¹⁶⁰ 95 N.J. 306, 326 (N.J. 1984).

¹⁶¹ 46 Ill. 2d 330, 336 (Ill. 1970).

¹⁶² *Nat'l Audubon Soc'y*, 33 Cal. 3d at 441 (“[Public trust] is an affirmation of the duty of the state to protect the people's common heritage of streams, lakes, marshlands and tidelands, surrendering that right of protection only in rare cases when the abandonment of that right is consistent with the purposes of the trust.”).

Union to Lear, New Union should have the sovereign title to Lake Union and the lands beneath it, thus precluding Plaintiff's claim to the title of the marsh.

F. It Was Improper For The District Court To Consider FWS And Brittain County Regulations Together; As Neither Results In Complete Deprivation Of Economic Value Standing Alone, There Was No Complete Deprivation Of Economic Value Here.

The Court below reasoned that analogizing the instant case to the doctrine of joint tortfeasors as expressed in *Velsicol Chemical Corp. v. Chattanooga Coke & Chemicals Co.*¹⁶³ was the appropriate solution to the apparent problem of cases where property owners are burdened by multiple regulations from multiple regulatory bodies, resulting in infringement upon their property interests greater than if either regulation occurred in isolation.¹⁶⁴ This Court should reverse the District Court's decision to apply this doctrine, particularly as expressed in *Velsicol*, because it is an incorrect and irrelevant doctrine that only confuses the issues of this case.

Because neither Defendant effected a complete deprivation of economic value, and no *Penn Central* analysis has occurred, it is impossible to correctly apportion the lost value between Defendants. This is ably illustrated in the instant case, where, paradoxically, when Brittain County apparently burdened one half-acre and FWS allegedly rendered ten acres worthless, *Velsicol* results in Brittain County bearing nine times FWS' damages. Brittain County bears the brunt of the cost apparently for no reason other than that the sovereign immunity of FWS, as a U.S. agency, allowed only \$10,000 in damages against it.

This paradoxical result is the product of the Court below failing to remain consistent in answering the "difficult, persisting question of what is the proper denominator in the takings

¹⁶³ 543 S.W.2d 337, 342 (Tenn. 1976). It is important to note that *Velsicol* was specifically abrogated by the 6th Circuit Court of Appeals in *Barnes v. Kerr Corp.*, 418 F.3d 583 (6th Cir. 2005). This abrogation may not be specifically relevant, as the District Court was offering *Velsicol* by way of example, and certainly not as binding New Union law.

¹⁶⁴ See 543 S.W.2d at 342; App. A at 11-12.

fraction.”¹⁶⁵ Plaintiff has brought *Lucas* claims, not *Penn Central* claims, and thus one hundred percent of the relevant denominator must be completely taken by the relevant regulation for her to prevail. For the purposes of the Wetlands Preservation Law, if the relevant denominator is solely the half-acre cove Plaintiff seeks to fill, the Heath and the ESA burden on it should not be considered in evaluating her claim. If the relevant Wetlands Preservation Law claim denominator is both the cove and the Heath, then the entire denominator has not been taken and her claim must fail. Analogously for the ESA and FWS’ implementing regulations, if the relevant denominator is solely the Heath and causeway, the Wetlands Preservation Law is an irrelevant burden on an adjacent parcel. If the relevant denominator is the Heath, causeway, and cove, the entire denominator is not burdened by FWS’ regulations and Plaintiff’s *Lucas* claim must fail. The Court below allowed Plaintiff to have it both ways, and the relevant denominator shifted as necessary: the denominator was solely the land of the Cordelia Lot until the cove was mentioned as a possible alternative location for a residence. The Court then overstated the importance of the cove and the Wetlands Preservation Law in the context of Plaintiff’s claim against FWS. The cove is properly treated as a proposed, but perhaps discountable alternative economic use offered to defeat Plaintiff’s *Lucas* claim.¹⁶⁶ Instead, the Court afforded it and the Wetlands Preservation Law dispositive weight, ignoring that the relevant denominator in Plaintiff’s case against FWS must be limited to that land which FWS actually regulates.

Even if this Court were to accept the opinion of the Court below that the regulatory actions of Brittain County and FWS are so analogous to torts that application of the joint tortfeasor doctrine as expressed in *Velsicol* is appropriate, the District Court erred in its

¹⁶⁵ *Palazzolo v. Rhode Island*, 533 U.S. 606, 631 (2001).

¹⁶⁶ *See Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1019 (1992); *Res. Invs., Inc. v. United States*, 85 Fed. Cl. 447, 490 (Fed. Cl. 2009) (citing *Loveladies Harbor, Inc. v. United States*, 21 Ct. Cl. 153, 158 (Ct. Cl. 1990)).

interpretation of *Velsicol*.¹⁶⁷ *Velsicol* notes that joint torts are property divided into four basic categories, and the applicable category to what occurred here is the fourth: “although there is no concert of action, nevertheless, the independent acts of several actors concur to produce indivisible harmful consequences.”¹⁶⁸ Here, it is true that there was no concerted action on the parts of FWS and Brittain County to encumber the Cordelia Lot. Nevertheless, the results Plaintiff alleges to be harmful are easily divisible: the Brittain County Wetlands Preservation Law burdens only the half-acre cove adjacent to the Heath, while the ESA and FWS regulations affect only the Cordelia Lot, and even that only temporarily.¹⁶⁹

Finally, it is incorrect that property owners would be denied recourse in the exceedingly rare cases where interaction of regulation by multiple governmental entities results in a greater taking than one of the regulations in question in isolation.¹⁷⁰ Property owners in that situation would be free to bring *Penn Central* partial takings claims against both regulatory bodies, and note the impact of the surrounding regulations as part of *Penn Central*'s ad hoc factual inquiry.¹⁷¹ The District Court's application of *Velsicol* is a solution in search of a problem, and a haphazard, ill-fitting solution at that. The proper approach would be a detailed *Penn Central* analysis allowing for nuanced consideration of the interaction of the regulations and their effects on the relevant characteristics of the parcel.

CONCLUSION

For the foregoing reasons, this Court should affirm the District Court's finding that the Endangered Species Act is constitutional, but reverse its finding of a regulatory taking.

¹⁶⁷ See 543 S.W.2d at 342.

¹⁶⁸ *Id.*

¹⁶⁹ See App. A at 5–7.

¹⁷⁰ See *id.* at 11. As the Court below noted, takings effected by the interaction of regulations from multiple sources is an apparently novel issue. *Id.*

¹⁷¹ See *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 130 (1978).

APPENDIX A

**UNITED STATES COURT OF APPEALS
FOR THE TWELFTH CIRCUIT**

September Term, 2016

Docket No. 16-0933

CORDELIA LEAR,

Plaintiff–Appellee–Cross Appellant,

v.

UNITED STATES FISH AND WILDLIFE SERVICE,

Defendant–Appellant–Cross Appellee,

and

BRITTAIN COUNTY, NEW UNION,

Defendant–Appellant.

**Appeal from the United States District Court for the District of New Union in
No. 112-CV-2015-RNR, Judge Romulus N. Remus**

ORDER

Following the issuance of an Order of the United States District Court for the District of New Union dated June 1, 2016 in 112-CV-2015-RNR, the United States Fish and Wildlife Service (“FWS”) and Brittain County, New Union each filed a Notice of Appeal on June 9, 2016. Thereafter, Cordelia Lear filed a Notice of Appeal on June 10, 2016.

Lear takes issue with the district court’s determination that the Endangered Species Act (“ESA”), 16 U.S.C. §§ 1531–1544 (2012), is a legitimate exercise of congressional power under Article I, Section 8, Clause 3 of the U.S. Constitution, as applied to a wholly intrastate population of Karner Blue Butterfly.

FWS takes issue with the district court’s decision with respect to its holding: that Lear’s claim for an uncompensated taking under the Fifth Amendment was ripe since Lear did not apply for an Incidental Take Permit (“ITP”) contemplated by ESA § 10, 16 U.S.C. § 1539(a)(1)(B); that the relevant parcel for the purpose of Lear’s takings claim based upon complete deprivation of economic value under *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992) is the Cordelia Lot as subdivided in 1965 and not the entirety of Lear Island; that the potential future

natural destruction of the Cordelia Lot's lupine fields, which are the butterflies' habitat, does not preclude Lear's takings claim; that the Brittain County Butterfly Society's offer to pay \$1,000 annually as rent for wildlife viewing did not preclude Lear's takings claim based upon complete deprivation of economic value; that the public trust principles inherent in Lear's title do not preclude her takings claim; and that the ESA as administered by FWS and a Brittain County, New Union Wetlands Preservation Law combine to deprive the Cordelia Lot of all economic value.

Brittain County agrees with FWS regarding all aspects of Lear's takings claim, but agrees with Lear that the ESA is unconstitutional as applied to the wholly intrastate population of Karner Blue Butterfly.

This Court has previously determined it has jurisdiction of the case and that the Federal Circuit does not.

Therefore, it is hereby ordered that each of the parties brief all of the following issues:

1. Is the ESA a valid exercise of Congress's Commerce power, as applied to a wholly intrastate population of an endangered butterfly that would be eliminated by construction of a single-family residence for personal use? (FWS argues the ESA is a valid exercise of the Commerce power; Lear and Brittain County argue it is not.)
2. Is Lear's takings claim against FWS ripe without having applied for an ITP under ESA § 10, 16 U.S.C. § 1539(a)(1)(B)? (Lear argues it is ripe; FWS and Brittain County argue it is not.)
3. For takings analysis, is the relevant parcel the entirety of Lear Island, or merely the Cordelia Lot as subdivided in 1965? (FWS and Brittain County argue the entire island is the relevant parcel; Lear argues the Cordelia Lot is.)
4. Assuming the relevant parcel is the Cordelia Lot, does the fact that the lot will become developable upon the natural destruction of the butterfly habitat in ten years shield the FWS and Brittain County from a takings claim based upon a complete deprivation of economic value of the property? (FWS and Brittain County argue the butterfly habitat's natural destruction in the future precludes Lear's takings claim; Lear argues it does not.)
5. Assuming the relevant parcel is the Cordelia Lot, does the Brittain County Butterfly Society's offer to pay \$1,000 per year in rent for wildlife viewing preclude a takings claim for complete loss of economic value? (FWS and Brittain County argue it does; Lear argues it does not.)
6. Assuming the relevant parcel is the Cordelia Lot, do public trust principles inherent in title preclude Lear's claim for a taking based on the denial of a county wetlands permit? (FWS and Brittain County argue public trust principles preclude Lear's takings claim; Lear argues they do not.)
7. Assuming the relevant parcel is the Cordelia Lot, are FWS and Brittain County liable for a complete deprivation of the economic value of the Cordelia Lot when either the federal or county regulation, by itself, would still allow development of a single-family residence? (Lear argues that even though the regulations would not individually amount to a taking under *Lucas*, the ESA and the Brittain County Wetlands Preservation Law together completely deprive the Cordelia Lot of all economic value; FWS and Brittain County argue

that the ESA and the Brittain County Wetlands Preservation Law must be considered separately and thus do not completely deprive the Cordelia Lot of all economic value.)

SO ORDERED.

Entered this 1st day of September, 2016.

[NOTE: No decisions entered or documents dated after September 1, 2016 may be cited in briefs or oral arguments.]

United States District Court for the District of New Union

-----	X	
Cordelia Lear,	:	
Plaintiff,	:	112-CV-2015-RNR
v.	:	Decision and Judgment
United States Fish and Wildlife Service,	:	
Defendant,	:	
and	:	
Brittain County, New Union	:	
Defendant.	:	
-----	X	

This case involves the application of the Endangered Species Act (“ESA”) and a municipal wetlands law to Plaintiff’s property on Lear Island in Brittain County, New Union. Lear Island contains the last remaining habitat for the New Union subpopulation of the Karner Blue Butterfly, a federally listed endangered species. Plaintiff seeks to build a single-family house for her own use on her irregularly shaped ten-acre property on Lear Island. Plaintiff challenges the constitutionality of the ESA as applied to her situation and asserts a claim against both the Fish and Wildlife Service (“FWS”) and Brittain County for an uncompensated taking of her property under the Takings Clause of the Fifth and Fourteenth Amendments.¹

A seven-day bench trial was held before this Court. Based on the Findings of Fact and Conclusions of Law set forth below, this Court enters judgment: 1) dismissing Lear’s claim seeking a declaration that the ESA is an unconstitutional exercise of legislative power as applied to her property; 2) awarding damages of \$10,000 in Lear’s favor against the FWS for an unconstitutional taking of her property in violation of the Fifth Amendment to the Constitution; and 3) awarding damages in the amount of \$90,000 against Brittain County for an unconstitutional taking of Lear’s property in violation of the Fifth Amendment to the Constitution.

FINDINGS OF FACT

1. Lear Island is an island in Lake Union and is approximately two miles long and one mile wide, consisting of 1,000 acres. Lake Union is a large interstate lake, which has been traditionally used for interstate navigation. Lear Island was granted to Cornelius Lear in 1803 by an Act of Congress. At the time, present-day New Union was part of the Northwest Territory. The 1803 grant included title in fee simple absolute to all of Lear Island and to “all lands under water

¹ Lear waived any damages in excess of \$10,000 in her takings claim against the United States of America, allowing her to proceed with her claim in this Court. See 28 U.S.C. §§ 1346(a)(2), 1491(a)(1); *Chabal v. Reagan*, 822 F.2d 349, 353 (3d Cir. 1987); *Shaw v. Gwatney*, 795 F.2d 1351, 1356 (8th Cir. 1986); *Goble v. Marsh*, 684 F.2d 12, 15 (D.C. Cir. 1982). She did not waive damages in excess of \$10,000 against Brittain County.

within a 300-foot radius of the shoreline of said island,” as well as an additional grant of lands under water in the shallow strait separating Lear Island from the mainland.

2. Cornelius Lear and his descendants have occupied Lear Island since the 1803 grant, using the island as a homestead, farm, and hunting and fishing grounds. During the latter half of the nineteenth century, the island was a productive farm, and produce was carried by boat from the island to the mainland. The original homestead is still located close to the north end of the island, near the strait that separates the island from the mainland. In the early twentieth century, the Lear Family constructed a causeway connecting the island to the mainland by road.

3. In 1965, King James Lear owned the entirety of the 1803 Lear Island grant. As part of an estate plan, King James Lear determined to divide Lear Island into three parcels, one for each of his daughters Goneril, Regan, and Cordelia. The Brittain Town Planning Board approved the subdivision of the property into three lots: the 550-acre Goneril Lot, the 440-acre Regan Lot, and the 10-acre Cordelia Lot². At the time of the subdivision, the Brittain Town Planning Board determined that each lot could be developed in conformance with zoning requirements with at least one single-family residence. King James Lear then deeded each of the lots, respectively, to his three daughters, reserving a life estate in each lot for himself. Shortly after deeding the properties to his daughters, King James Lear constructed a residence on the Regan lot, for use by his daughter Regan. He continued to live in the homestead, located on the Goneril Lot.

4. King James Lear died in 2005, and each of the three daughters came into possession of their deeded properties. In 2012, Plaintiff Cordelia Lear decided to build a residence on her lot.

5. The Cordelia Lot is situated at the northern tip of Lear Island. The lot consists of an access strip that is 40 feet wide by 1,000 feet long, and an open field that comprises the remaining nine acres of uplands. In addition, there is about one acre of emergent cattail marsh in a cove that historically was open water and was historically used as a boat landing.

6. The nine-acre open field and access strip has been kept open by annual mowing by the Lear Family for several decades. The family has referred to the Cordelia Lot as “The Heath” because it was kept open, unlike the rest of the island, which naturally became wooded after agricultural use of the island ceased in 1965. The Heath was kept open by annual mowing each October.

7. The Heath and the access strip have become covered with wild blue lupine flowers, which thrive in the sandy soil of Lear Island. Fields of wild blue lupines are essential for the survival of Karner Blue larvae, which can only feed on the leaves of blue lupine plants. The ideal habitat for the Karner Blues consists of partially shaded lupine flowers near successional forests.

8. The Karner Blue is an endangered species. 50 C.F.R. § 17.11 (2015). It was added to the federal endangered species list on December 14, 1992. 57 Fed. Reg. 59,236 (Dec. 14, 1992).

9. Although populations of Karner Blues survive in other states, the only remaining population of the butterfly in New Union lives on the Heath on Lear Island. Karner Blues do not

² The acreage figures do not include deeded lands underwater.

migrate. Instead, eggs are laid in the fall, overwinter, and hatch in the spring. A second brood hatches in the summer. Karner Blue larvae remain attached to lupine plant foliage until they emerge from chrysalis as butterflies, and any disturbance of the lupines during the larval and chrysalis stages would result in the death of the butterflies. Karner Blue populations have difficulty migrating to new habitats as their flight distance is short, and they must follow woodland edge corridors. The New Union subpopulation of Karner Blue is entirely intrastate and does not travel across any State boundaries.

10. The Heath, consisting of lupine fields adjacent to the successional forest on the Goneril lot, provides ideal habitat for the Karner Blues, which thrives in partially shaded lupine fields. The access strip provides particularly good partially shaded habitat for Karner Blues. The Heath was designated by the FWS as critical habitat for the New Union subpopulation of the Karner Blues in 1992.

11. In April 2012, Cordelia Lear contacted the New Union FWS field office to inquire whether development of her property would require any permits or approvals because of the existence of the endangered butterfly population. FWS agent L.E. Pidopter advised Plaintiff that any disturbance of the lupine habitat in the Heath other than continued annual mowing would constitute a “take” of endangered butterfly. Pidopter also advised Plaintiff that it was possible to obtain an Incidental Take Permit (“ITP”) under section 10 of the ESA, but in order to file an application for such a permit, Ms. Lear would have to develop a habitat conservation plan (“HCP”) for the Karner Blues and an environmental assessment document under the National Environmental Policy Act. Pidopter advised Ms. Lear that in order to be approvable, an HCP would have to provide for additional contiguous lupine habitat on an acre-for-acre basis, including any disturbance of the access strip. Pidopter also advised that an approvable HCP would require a commitment to maintain the remaining lupine fields through annual fall mowing.

12. The only land that is contiguous to the Heath is the Goneril Lot. Cordelia Lear is estranged from her sister, and Goneril Lear has refused to consider cooperating in any HCP that involves restrictions on her property.

13. Cordelia Lear investigated the cost of preparing the required HCP for the Karner Blues, and was advised by an environmental consultant that preparation of an application for an ITP, including the required HCP and environmental assessment documents, would cost \$150,000.

14. Following Cordelia Lear’s inquiry to the FWS, the FWS New Union field office sent Cordelia Lear a letter on May 15, 2012 confirming that her entire ten-acre property was a critical habitat for the Karner Blues and that any disturbance to the lupine fields other than annual mowing during the month of October would constitute a “take” of the Karner Blues in violation of section 9 of the ESA. The letter invited Plaintiff to submit an application for an ITP and referred her to the FWS’s Habitat Conservation Planning Handbook for information on how to develop an acceptable HCP to submit with an ITP application. The FWS letter reiterated that an acceptable HCP would require, at a minimum, that all acreage of lupine field disturbed by development would have to be replaced with contiguous acreage, and that the property owner would have to commit to maintain the remaining and newly created lupine fields by annual mowing each October.

15. Without annual mowing, the lupine fields on the Cordelia Lot would naturally convert to a successional forest of oak and hickory trees, eliminating the Karner Blues' habitat. This process would take about ten years. After ten years, this natural ecological process would result in the extinction of the New Union subpopulation of the Karner Blues, unless a replacement habitat was created within a one-thousand-foot radius of the existing fields.

16. Rather than pursue an ITP application with the FWS, Plaintiff developed an alternative development proposal ("ADP") that would not disturb the lupine fields. In the ADP, Plaintiff proposed to fill one half-acre of the marsh in the cove to create a lupine-free building site, together with an access causeway to provide access from the shared mainland causeway without disturbing the access strip. As the U.S. Army Corps of Engineers considers this portion of Lake Union to be "non-navigable" for purposes of the Rivers and Harbors Act of 1899, and because construction of residential dwellings involving one half-acre or less of fill is authorized by U.S. Army Corps of Engineers Nationwide Permit 29, *see Issuance of Nationwide Permit for Single-Family Housing*, 60 Fed. Reg. 38,650 (July 27, 1995), no federal approvals would be required for this project.

17. The ADP required a permit to fill the cove marsh, pursuant to the Brittain County Wetland Preservation Law, which was enacted in 1982. In August 2013, Plaintiff duly filed a permit application with Brittain County Wetlands Board. The permit was denied in December 2013, on the grounds that permits to fill wetlands would only be granted for a water-dependent use, and that a residential home site was not a water-dependent use.

18. The fair market value of the Cordelia Lot without any restrictions that would prevent development of a single-family house on the lot is \$100,000. Property taxes on the Cordelia Lot are \$1,500 annually. There is no market in Brittain County for a parcel such as the Cordelia Lot for recreational use without the right to develop a residence on the property, nor does the property have any market in its current state as agricultural or timber land. Plaintiff has not sought reassessment of her property following the denial of the permit under the Brittain County Wetland Preservation Law. The Brittain County Butterfly Society has offered to pay Cordelia Lear \$1,000 annually for the privilege of conducting butterfly viewing outings during the summer Karner Blue season, but she rejected the Society's offer.

19. Plaintiff then commenced this action in February 2014, seeking a declaration that the ESA was an unconstitutional exercise of congressional legislative power, or alternatively, seeking just compensation from FWS and Brittain County for a regulatory taking of her property.

CONCLUSIONS OF LAW

1. THE ESA IS A VALID EXERCISE OF CONGRESS'S COMMERCE POWER.

Section 9 of the ESA prohibits the "take" of any endangered species. *See* ESA § 9(a)(1)(B), 16 U.S.C. § 1538(a)(1)(B). The term "take" is defined by regulation to include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3 (2015). Citing *United States v. Lopez*, 514 U.S. 549 (1995), and *United States v. Morrison*, 529 U.S. 598 (2000), Plaintiff argues that the ESA, by prohibiting the "take" of an intrastate species, seeks to

regulate noneconomic activities such as land clearing and vegetation removal. *Lopez* and *Morrison* reflect that, when relying on the substantial aggregate effects of an activity on interstate commerce as the basis for regulation under the Commerce power, U.S. Constitution art. I, § 8, cl. 3, the relevant regulated activity must itself be economic in nature. *See Morrison*, 529 U.S. at 617. In *Lopez*, the Court struck down the Gun-Free School Zones Act. *See* 514 U.S. at 561. In *Morrison*, the Court struck down the Violence Against Women Act, which made certain gender motivated acts of violence a federal crime. *See* 529 U.S. at 617. In both cases, the Court held that Congress lacked authority under the Commerce power to regulate noneconomic activity.

Plaintiff argues that the prohibition against “taking” an intrastate species such as the Karner Blue, like gun possession and rape, are noneconomic activities that cannot support the assertion of legislative authority under the Commerce Clause. However, this Court finds that the relevant activity is the underlying land development through construction of the proposed residence, and that this activity is clearly an economic activity, involving as it does the purchase of building materials and the hiring of carpenters and contractors. Although the Twelfth Circuit has not addressed the question, every court of appeals that has considered a Commerce Clause challenge to the ESA “take” prohibition has upheld the Act. This Court follows the weight of precedent and likewise holds that the ESA prohibition against an unpermitted “take” of a wholly intrastate species is a valid exercise of the Commerce power. *See San Luis & Delta-Mendota Water Auth. v. Salazar*, 638 F.3d 1163, 1177 (9th Cir. 2011); *Alabama-Tombigbee Rivers Coal. v. Kempthorne*, 477 F.3d 1250, 1277 (11th Cir. 2007); *Rancho Viejo, LLC v. Norton*, 323 F.3d 1062, 1069 (D.C. Cir. 2003); *GDF Realty Investments, Ltd. v. Norton*, 326 F.3d 622, 640–41 (5th Cir. 2003); *Gibbs v. Babbitt*, 214 F.3d 483, 505–06 (4th Cir. 2000); *Nat’l Ass’n of Home Builders v. Babbitt*, 130 F.3d 1041, 1057 (D.C. Cir. 1997).

2. APPLICATION OF THE ESA INCIDENTAL TAKE PROHIBITION AND THE BRITTAIN COUNTY WETLANDS PRESERVATION LAW TO PLAINTIFF’S PROPERTY HAS RESULTED IN AN UNCOMPENSATED TAKING OF HER PROPERTY IN VIOLATION OF THE FIFTH AMENDMENT.

Plaintiff also asserts a takings claim against FWS and Brittain County. Citing *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992), Lear argues that the application of ESA and Brittain County Wetlands Preservation Law combine to deprive her of any economic use of her property,³ and thus constitute a regulatory “take” of her property requiring just compensation under the Fifth and Fourteenth Amendments.

The Fifth Amendment to the Constitution provides that “nor shall private property be taken for public use without just compensation.”⁴ This Court concludes that the combined application

³ Plaintiff does not advance a claim for a partial regulatory taking based on the principles of *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 123–28 (1978). *See Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg’l Planning Agency*, 535 U.S. 302, 317–18 (2002); *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg’l Planning Agency*, 216 F.3d 764, 773 (9th Cir. 2000), *aff’d* 535 U.S. 302.

⁴ The Just Compensation Clause of the Fifth Amendment has been incorporated against the states through the Fourteenth Amendment’s Due Process Clause. *See Chicago, B. & Q. R. Co. v. Chicago*, 166 U.S. 226, 239 (1897).

of the ESA prohibition against “taking” the Karner Blue and the Brittain County Wetlands Preservation Law have resulted in the taking of Plaintiff’s property without compensation.

A. Plaintiff’s Takings Claim Against the FWS is Ripe for Litigation.

Defendant FWS argues that Plaintiff’s takings claim is not ripe, as Plaintiff never formally applied for an ITP, citing *Morris v. United States*, 392 F.3d 1372, 1376–77 (Fed. Cir. 2004). However, a takings claimant need not perform a futile act, when the government has already declared a policy of denying the very sort of permit the claimant would need. *See Palazzolo v. Rhode Island*, 533 U.S. 606, 626 (2001). Here, the FWS advised Plaintiff that any ITP would of necessity include conditions that it would be impossible for Plaintiff to satisfy. In addition, this Court finds that application for a permit would be futile where it is undisputed that the cost of applying for a permit exceeds the fair market value of the property in question. Pursuit of a permit is also unnecessary if a Plaintiff can establish that “the procedure to acquire a permit is so burdensome as to effectively deprive plaintiffs of their property rights.” *Hage v. United States*, 35 Fed. Cl. 147, 164 (1996).⁵

B. The Relevant Parcel for Takings Analysis is the Cordelia Lot, Not All of Lear Island.

FWS and Brittain County argue that the relevant parcel for determining whether the ESA and Brittain County Wetlands Preservation Law restrictions allow some residual economic use of the lot should be the entire Lear Island, not just the Cordelia Lot. In their view, since Cordelia Lear received her property as a gift from her father, the relevant “investment backed expectations” for the economic value of the property should be based on her ancestor’s acquisition of the entirety of Lear Island by congressional grant in 1803. The Defendants argue that the Lear family, having enjoyed and exploited the entirety of Lear Island for nearly two centuries before subdividing it into three lots, cannot now claim that it has been deprived of all economic value because one of those lots has restrictions. They add that the Supreme Court has, in its more recent takings cases, rejected so-called “conceptual severance” arguments that would apply a takings analysis to just one portion of a combined property. *See Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*, 535 U.S. 302, 330 (2002) (rejecting claim based on current permissible uses of property separate from future permissible uses after moratorium expiration); *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 500–01 (1987) (rejecting claim that “support estate” was distinct property for purpose of takings analysis of a Pennsylvania law that prohibited mining of coal support pillars); *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 130–31 (1978) (rejecting claim that air rights were distinct from existing surface use of property). FWS and Brittain County argue instead for a “flexible approach” to determining the relevant parcel for takings analysis, which takes into account the value of other lots in the same subdivision. *See Loveladies Harbor, Inc. v. United States*, 28 F.3d 1171, 1181 (Fed. Cir. 1994); *Deltona Corp. v. United States*, 657 F.2d 1184, 1192 (Ct. Cl. 1981).

⁵ Although no party addressed the issue before this Court, this Court notes that Plaintiff’s takings claim against Brittain County is similarly ripe, since the Constitution of the State of New Union does not include a just compensation clause nor do the State’s statutes provide a procedure for seeking just compensation. *See Williamson Cnty. Reg’l Planning Comm’n v. Hamilton Bank of Johnson City*, 473 U.S. 172, 194 (1985).

Whatever the merits of this flexible approach, this Court rejects the application of such an approach where ownership of the relevant lots has been transferred to different parties. Formal subdivision of a property into separate lots should be determinative. *See Loveladies Harbor*, 28 F.3d at 1181. There is no evidence that the subdivision was undertaken as a subterfuge to create a takings claim. Accordingly, the relevant parcel for takings analysis is the Cordelia Lot.

C. The Relevant Time Period for Takings Analysis is the Current Permissible Development of the Property.

Citing *Tahoe–Sierra*, Defendants FWS and Brittain County argue that any restrictions on the Cordelia Lot should be considered temporary, since all Plaintiff would need to do is refrain from mowing her fields and after ten years the natural processes of succession will result in the elimination of the Karner Blues’ habitat. Although *Tahoe–Sierra* held that the imposition of a multiyear building moratorium was not a complete deprivation of the economic value of the underlying property, *see* 535 U.S. at 332, this Court finds the instant circumstances to be distinguishable. The *Tahoe–Sierra* moratorium did not extend for an entire decade. Moreover, this Court notes the irony of the FWS relying on the prospective extinction of the very subpopulation of Karner Blues it is fighting to protect as an argument against finding a taking of Plaintiff’s property. Accordingly, this Court concludes that the potential natural destruction of the Karner Blues’ habitat does not preclude Plaintiff’s takings claim now.

D. Public Trust Limits on Uses of State Navigable Waters Do Not Inhere in the Lear’s 1803 Congressional Grant of Title.

Brittain County argues that it has no liability for a taking of the Cordelia Lot, as the limits on filling and developing lands underwater are well-established public trust limits. Brittain County relies on dicta in *Lucas* suggesting that, in limited circumstances, compensation is not required for development limits that “inhere in the title itself, in the restrictions that background principles of the State’s law of property and nuisance already place upon land ownership.” 505 U.S. at 1029. Brittain County argues that the New Union’s interest in preserving navigation and protecting other public trust interests in navigable waters constitutes such a “background principle” of State law. However, Brittain County points to no applicable New Union precedent (and this Court has been unable to locate any) establishing the scope of New Union’s protections for public trust waters. Predicting how a New Union court would rule on such matters is unnecessary, however, as this Court finds that at the time of the 1803 grant to Cornelius Lear, which included lands under water within 300 feet of the shoreline, the United States did not recognize any public trust rights in non-tidal navigable waters such as Lake Union. *See P.P.L. Montana L.L.C. v. Montana*, 132 S. Ct. 1215, 1227 (2012) (collecting cases suggesting the bed of non-tidal rivers were considered to be private property prior to 1810). Thus, no public trust navigational reservation can be presumed to have existed at the time of the Lear grant in 1803. Brittain County also argues that, under the “equal footing doctrine,” the State of New Union must be presumed to have taken title to lands under water on the same terms as the thirteen original states. *See id.* at 1227–28. However, the equal footing doctrine does not avail Brittain County, as a prior clear congressional grant gives superior title to the congressional grantee as against a subsequent “equal footing” claim by a State. *See Shively v. Bowlby*, 152 U.S. 1, 57–58 (1894). Accordingly, the State of New Union (and by

extension Brittain County) cannot claim any inherent public trust limits on the development of lands underwater that were part of the 1803 grant.

E. The Cordelia Lot Has Been Completely Deprived of All Economic Value.

FWS and Brittain County make two arguments against finding that the ESA restrictions deprive the Cordelia Lot of all economic value. First, the Defendants argue that neither the ESA nor any other federal regulation precludes development of a residence in the cove area, together with a causeway for access. Similarly, the Brittain County Wetlands Preservation Law does not prohibit any development in the Heath. As a consequence, in Defendants' view, neither regulation completely deprives the Cordelia Lot of all economic value. Second, FWS and Brittain County argue that, in any event, the willingness of the Brittain County Butterfly Society to pay to run butterfly tours demonstrates that the property retains some economic value even if it cannot be developed. Neither argument is persuasive.

1) *The Federal and Local Restrictions Must Be Combined to Consider Whether a Take Has Occurred.*

FWS argues that because the ESA restrictions do not restrict filling of the cove area and development of a residence there (nor does any other federal regulation), the Cordelia Lot has not been completely deprived of all economic value of by the FWS. *See Palazollo*, 533 U.S. at 631 (holding the existence of developable uplands can defeat a takings claim based on wetlands regulations affecting most, but not all, of property). It is questionable whether the *Palazollo* holding even applies where the unrestricted "land" is all actually under water and cannot be developed without fill. However, in this case, unlike *Palazollo*, the non-federally restricted portion of the property cannot be developed, because of the existence of local restrictions. For its part, Brittain County makes the reciprocal argument that the Wetlands Preservation Law does not prohibit any construction in the causeway and Heath.

This case presents the apparently novel question of whether a property owner can make a claim for a complete deprivation of economic value of a lot where federal regulations restrict one part of the property and local municipal regulations restrict another part. Accepting FWS's and Brittain County's arguments would mean that a property owner deprived of all economic use of their property would be denied recourse, as the federal government and local government each claim that their own regulation, by itself, leaves some developable portion. This situation is not unlike the case of a joint tort, where neither actor acting alone causes a harm, but both actors acting together cause a harm. The prevailing rule is that, in such a case, where the harm is indivisible, each tortfeasor is jointly and severally liable to the plaintiff. *See Velsicol Chem. Corp. v. Rowe*, 543 S.W.2d 337 (Tenn. 1976). Accordingly, both FWS and Brittain County are jointly and severally liable for any taking of Plaintiff's property.

2) *Plaintiff Has Been Deprived of All Economic Use of Her Property.*

The Supreme Court established in *Lucas* that where government regulation leaves a property owner with no economically remunerative use of their property, a compensable taking has occurred without regard to balancing any public interests served by the regulation. The

Defendants argue that Plaintiff is not without economically remunerative use of the property, as the Brittain County Butterfly Society has offered to pay Plaintiff \$1,000 annually for the privilege of conducting tours on the property. This is less than the amount of annual property taxes on the lot. A piece of real property that incurs more in property taxes than it can generate in income is by definition without economic value. Accordingly, Plaintiff has been deprived of all economic use of her property and is entitled to compensation from the FWS and Brittain County.

CONCLUSION

For the foregoing reasons, judgment is hereby entered as follows:

- 1) Awarding Plaintiff \$10,000 damages against defendant United States Fish and Wildlife Service;
- 2) Awarding Plaintiff \$90,000 damages against defendant Brittain County; and
- 3) Dismissing Plaintiff's claim for declaratory judgment declaring the ESA unconstitutional as applied to her property.

So entered:

/s/ Romulus N. Remus

Romulus N. Remus

U.S.D.J.

APPENDIX B

Purpose of the Plan

This plan outlines objectives, strategies and techniques for recovery of the Karner blue butterfly (*Lycaeides melissa samuelis*) in Ohio during 2012-2022. Revised in 2005 and 2012, the plan includes current protocol and procedural modifications, as well as updates on threats.

Background

Taxonomy

The Karner blue (*Lycaeides melissa samuelis*) is in the lepidopteran family Lycaenidae, the gossamer wing butterflies. This family is the most diverse in Northwest Ohio and second only to the skippers in numbers (Opler 1984). Lycaeninae is the subfamily and Lycaenini the tribe to which the Karner blue is assigned. There are nine genera in the eastern half of the United States. The genus *Lycaeides* contains two species in the northeast; Nabokov's blue (*Lycaeides argyrognomon nabokovi*) and the melissa blue (*Lycaeides melissa*). *L. melissa* itself is divided into five subspecies; the most distinct of which is *L. m. samuelis* (Nabokov 1944 in Packer 1987).

There are color and pattern differences between males and females of the species. Dorsally, both male and female fore wings exhibit fuscous dusting with a narrow dark marginal border. On the dorsal hind wing, however, females have orange sub-marginal lunules. Males of the species lack these. The ventral surface of the hind wing of both male and female exhibit sub-marginal orange marks inside a row of metallic sky-blue spots. There are no tails on the hind wings. There are a number of species with which the Karner blue may be confused.

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The Karner blue was known from 21 Ohio localities in 1975. However, since that time, the number of populations has been drastically reduced (Packer 1987). Extant populations occur in New York, Indiana, Wisconsin, Michigan and New Hampshire. The Karner blue is critically endangered in New Hampshire and extirpated in Illinois, Massachusetts, Pennsylvania and Ontario, Canada. It is thought to be secure in Michigan and Wisconsin. The Karner blue butterfly was extirpated in Ohio as of 1998 until its reintroduction in 1998.

In Ohio, the Karner blue butterfly was historically limited to the northwestern portion of the state, along a sandy belt of soil known as the Oak Openings geologic area (Shuey et al. 1987 b). This area is 22 miles long, six miles wide (Weber and Huffman 1989) and extends into lower Michigan. Grasses and prairie forbs grew in the sunlit herbaceous layer of these openings. Hazel thickets and scrubby oak trees were thinned by frequent fires, set either by lightning or by Native Americans (Gordon 1969). A map of the Oak Openings Region is provided in Figure 1.

Historically, fire played an important role in maintaining these openings (Gilbert 1873 a, b). Lupine, the only known host plant for the Karner blue butterfly, flowered heavily after a burn and thrived in the fire maintained openings. But while the Karner blue butterfly would not survive a hot fire, it is believed to have re-colonized burned areas by immigrating from nearby populations. Eventually, fire suppression after settlement allowed woody plants to invade the openings and shade out the lupine.

The water table was lowered by ditching beginning in the 1870s (Hehr 1970) and the oak savannas and wet prairies were converted to pastures and farms. Farmed-out areas were planted in pines in the 1930s to keep sand from blowing across roads and against houses. Pockets of wet prairies and savanna survived, along with the Karner blue butterfly, into the 1980s. Currently, massive housing developments and sand mines threaten to irretrievably change the Oak Openings.

The decline of the Karner blue butterfly in the Oak Openings tracks that of the oak savanna community. Records compiled by the Ohio Lepidopterists show that in the 1930s and early 1940s, John Thomas and Homer Price collected Karner blue butterflies from several locations in the Oak Openings. In 1983, John Shuey, while inventorying the Oak Openings for the Nature Conservancy, reported a seemingly viable population of Karner blue butterflies on and adjacent to a Nature Conservancy Preserve in the Oak Openings (Shuey 1986). It was, he felt, the only healthy population left in the Oak Openings. In 1986, after a summer of intensive survey, Shuey reported only one male Karner blue in the entire area. In 1987, staff and volunteers from the Toledo Metroparks and Ohio Lepidopterists continued the search and the "Lupine Hotline" rallied the public to call in remaining Oak Openings lupine sites. Areas were surveyed for larval feeding "windows" and any adult Karners. An Ohio Wildlife Diversity grant funded more comprehensive survey work. Three male Karner blue butterflies were observed: one near Kitty Todd Preserve, another off Frankfort Road, and the last off Hill Avenue in Holland. Petersburg Game Area (MI) was also checked. Unfortunately, this population too, became extirpated one year later.

The Karner blue butterfly is listed as a federally (U.S. Fish and Wildlife Service 1992) and state (Ohio Department of Natural Resources 1992) endangered species.

Biology

The Karner blue is bivoltine. In Ohio, the adults fly from mid-May through mid-June and again from early July to mid-August (Shuey, pers. comm.). Characteristically, the second generation is more abundant in numbers than the first (Packer, 1987).

The egg is very small, greenish-white, echinoid with a reticulated surface (Rittner 1976, Savignano 1987). They are laid singly on the petiole of a lupine leaf, generally low to the ground (Packer 1987). Second generation eggs are deposited on dry lupine stems and adjacent grass plants (Savignano 1987; Schweitzer 1989). Eggs hatch in seven to eight days (Rittner 1976). Packer (1987) indicates that females prefer shaded lupine plants for oviposition. The Karner blue over-winters as eggs (Schweitzer 1989). Other reports indicate that it also over-winters as larvae (Rittner 1976), but these reports have not been substantiated.

Larvae are dorsoventrally flattened, slug-like and covered with fine, dense hair. Coloration is pale green. Most sources report five instars (Opler 1984). Anatomical studies by Savignano (1987) reveal four distinct instars. Larvae are myrmecophilous, producing a sweet secretion from three glandular organs, which in some instances is utilized by ants. Ant attendance, however, has been documented only in third and fourth instar larvae, which possess fully mature organs (Savignano, 1987). Savignano's study of ant attendance in the Albany Pine Bush population revealed that ants from several genera tend Karner blue larvae. Overall effects of ant attendance on Karner blue survival, however, are still inconclusive and it is unlikely that one particular ant species is critical to the survival of the Karner blue.

The eating pattern of the Karner blue larvae is distinct. Both the young instars and the later instars eat away the ventral epidermis. This leaves a characteristic opaque 'window' in the leaf. Larvae mature in 18-21 days (Rittner 1976).

Chrysalides are pea green in color with a yellow-tinged abdomen (Opler 1984). Packer (1987) reports them hanging from stems and twigs near the host plant. Dirig (1976) however, states that pupation occurs in leaf litter adjacent to the plant. Eclosion occurs in 7-11 days. Total development time from oviposition to eclosion is 31-42 days.

First generation adults begin to emerge in the middle of May and are in flight through the middle of June. Second generation adults emerge beginning the first week in July and continue through the first week in August. Adults are diurnal and generally fly from about 8:00 AM to 7:00 PM. Activity ceases in very hot weather and on rainy or cloudy days when the temperature drops below 75°F (Schweitzer 1989). The average life span of the adult is approximately five days. Neither sex disperses very far from the home site, but may occasionally move up to one kilometer (Fried, 1987). Dispersal is probably more frequent when the habitat is of a very poor quality (Schweitzer 1989).

Restoration Potential And Limiting Factors

Habitat

Success of the Karner blue butterfly recovery effort in the Oak Openings area will depend on the quality and quantity of habitat found within the oak savanna communities. To date, the ODNR, Division of Natural Areas and Preserves, Division of Forestry, and Division of Wildlife, the Metropolitan Park District of the Toledo Area, The Nature Conservancy, and the Toledo-Lucas County Port Authority have collaborated in an effort to manage for the oak savanna communities. Several of their areas support degraded but viable oak savanna communities. With continued active management, oak savanna communities can provide the essential and the specific habitat requirements necessary to accomplish the objective of establishing self-sustaining populations of Karner blue butterflies in the Oak Openings.

Lupine. The Karner blue is closely associated with the legume, wild lupine (*Lupinus perennis*). Lupine is the only known host plant for the Karner blue. In Ohio, wild lupine is most abundant in the area near Toledo known as the Oak Openings. This region is characterized by sandy soils, relicts of sand beaches and ridges that were deposited in glacial Lake Warren, preceding the formation of Lake Erie. When the beaches were first formed, they were fairly level. When the water dropped, the sand quickly dried and was subsequently blown into dunes. Today, these dunes represent perched regions surrounded by low topography. The dunes are very dry while the low spaces between are waterlogged. Wild lupine is characteristic of the perched areas which have little moisture.

Wild lupine is a member of the family Fabaceae, the peas. The flower color varies from white to purple and pink but is usually a violet-blue. Flowers may occur on one or more dense racemes on each plant. The plants themselves usually are found in dense clumps of several dozen plants, and are strikingly showy when in bloom. Bloom time in Ohio is mid-May through the first week of June. The leaf is compound with seven to eleven leaflets per leaf. The plant color is a grayish-green.

Lupine has rather exacting habitat requirements. It grows best in very dry, sandy soil and in situations where it is exposed to direct sunlight for most of the day (Packer 1987). The plant does not thrive in shady locations. In fact, lupine will fail to bud and flower if shade persists.

Prior to settlement and the onset of agriculture, the Oak Openings area was subjected to occasional wildfires. These fires were important to the long-term survival of lupine. Thin barked trees and shrubs were killed by the fires, permitting much needed sunlight to reach the lupine plants beneath. Thus, the lupine was able to survive.

However, the practice of fire suppression, concurrent with urbanization and agriculture, caused a drastic decline in lupine populations. Certainly many populations were eliminated. Consequently, localities where the Karner blue could reproduce and flourish declined as well.

Today, lupine is found predominantly in highly disturbed areas of the Oak Openings. Railroad rights-of-way, power line rights-of-way, pipeline rights-of-way, abandoned agricultural areas, borrow pits and ATV trails are all excellent areas to find lupine. Likewise, agencies and other landowners are now managing areas specifically for lupine.

Nectaring Plants and Roosting Areas. Besides the obvious need for adequate sources of lupine to use as host plants, Karner blues also require adequate nectar food sources for both the first and second generations. Habitat that contains a large number of lupine plants but no nectar sources is not suitable to support the Karner blue. Generally, Karner blues are not particularly fussy about the species of plant they will visit to obtain nectar. They do, however, seem to have preferences when certain plant species are available. Species providing nectaring sources are listed in Tables 1 and 2.

Adult Karner blues also require roosting areas for resting and escaping from the heat. Tall grasses such as big bluestem (*Andropogon gerardi*) seem to provide the preferred roosting sites (Schweitzer 1989).

Ant Attendance. Myrmecophilous associations with Lycaenid butterflies are well noted in the literature (Webster and Nielson 1984). It is thought that the ants increase the survival rate of Lycaenid larvae through a relationship that may be facultative. Throughout the range of the Karner blue, a clear pattern of ant association has not been documented. Savignano (1987) found nine species of ants tending Karner blue larvae at two sites in Albany County, New York. However, no clear trend of increased survivorship was found among those larvae that were tended by the ants.

Pesticides. Herbicide use is not expected to pose a significant threat to the recovery of the Karner blue butterfly at sites in the Oak Openings selected for its reintroduction. The use of herbicides has had its most serious impacts on lupine and the Karner blue along railroad rights-of-way. Historically, wild lupine and the Karner blue butterfly existed alongside the railroad during the time when mechanical means, instead of herbicides, were used to control encroachment of woody growth. By the mid-1970s, the Karner blue butterfly no longer existed along this railroad site. Utility rights-of-way and transportation avenues traverse the Oak Openings region. Such areas, if they fulfill the necessary habitat requirements, may prove beneficial as corridors for future Karner blue dispersal. Indiscriminate use of herbicides to control woody vegetation in these areas would reduce or eliminate this potential.

Insecticides and pesticides are used to combat conflicts between areas of human concern and the presence of certain insect species. Unfortunately, the existence of non-target species like the Karner blue butterfly can be jeopardized by the methods used to control insect species considered undesirable. Monitoring and coordination of insect control programs will be necessary to prevent conflicts with Karner blue reintroduction and restoration. Spray and other treatment programs can be adjusted through establishment of "no spray" zones to minimize or eliminate potential impacts on Karner blue recovery efforts in Ohio.

Presently, the most notable treatment program for insects in the Oak Openings is that of mosquito control. Due to the threat of West Nile Virus it is likely that treatment programs for mosquito control will continue into the future.

Another insect species of concern, the gypsy moth (*Lymantria dispar*), is found in the Oak Openings of northwest Ohio. Areas with noticeable caterpillar populations and experiencing defoliation may be subject to treatment to eradicate the gypsy moth. The use of the naturally occurring bacterium Btk. (*Bacillus thuringiensis*) to kill gypsy moth larvae is gaining in popularity in Ohio. While proven effective against the gypsy moth caterpillar, Btk will also kill caterpillars of the Karner blue. The Recovery Team will work to help inform the public about the history and life cycle of the gypsy moth, the pros and cons of some of the biological and chemical treatments available, and the moth's inevitable range expansion through Ohio.

In 2009 ODNR Division of Wildlife issued a policy on gypsy moth control. In general pesticides should be used as the a last resort to treat this species. Proactive actions to prevent excessive populations of gypsy moths are encouraged. Due to the various rare species of lepidopterans and other arthropods it is recommended that the use of dimilin be avoided within the Oak Openings region. The selection of gypcheck is recommended instead. Btk maybe used on a case by case basis. Most of the pesticide applications for gypsy moth are conducted aerially. Any aerial applications will have some potential for drift from the target area. Aerial application should be conducted as early in the day as possible when wind activity is minimal. Aerial applications should also consider the direction of drift and occur only when potential drift could occur opposite the direction of known habitat. Proactive, comprehensive methods should be used to limit the spread of the gypsy moth. These efforts may include the removal of egg masses, placing burlap around the base of tree trunks, reducing firewood movement, and the use of specific virus, fungus, or mating disruption/sex pheromones which only target gypsy moths. ODNR Division of Wildlife, ODNR Division of Forestry, and USFWS meet with the Ohio Department of Agriculture (ODA) every year to review the plans for the gypsy moths suppression and slow-the-spread programs. Northwest Ohio is located within the suppression program and treatments are sometimes proposed for areas with high densities of gypsy moths. The Ohio recovery team has worked and will continue to work with ODA to develop guidelines for the application of insecticides within the vicinity of known habitat.

Deer

The white-tailed deer (*Odocoileus virginianus*) is the largest native herbivore found in the Oak Openings region. In situations where deer numbers are not controlled, the biological carrying capacity of their habitat may be exceeded. Even low deer densities can exceed carrying capacity. One result can be overgrazing which alters plant species composition, distribution, and abundance. In severe cases, the structural diversity of understory plants may be reduced to the extent that seedlings are unable to establish themselves. This scenario has occurred and been documented in Ohio and other areas of the Midwestern United States. There exists the distinct potential for rapid growth of the deer population in portions of the Oak Openings that contain Karner blue habitat. Local occurrences where deer have heavily browsed lupine and other nectar-producing plants have been

observed (Michelle Grigore pers. comm.). Deer management options must be explored and implemented should deer populations in the Oak Openings threaten Karner blue reintroduction and establishment. One deer management option, that of controlled hunting, has been initiated at one preserve in the Oak Openings by the ODNR, Division of Natural Areas and Preserves. The white-tailed deer population continues to increase in abundance. Deer browse on lupine flowers and leaves reducing nectar availability for adults and reduced food availability for larvae. Excessive browsing may lead to reduced lupine reproduction by limiting seed production due to herbivory of flowers. Reduction in seed production has been observed as a result of deer browse on lupine flowers at Oak Openings Metropark (Karen Menard pers. comm.).

Land Use

Land use change in the Oak Openings is one of the many factors that contributed to the demise of the Karner blue butterfly in Ohio. A number of estimates dealing with land use patterns in the Oak Openings have been made. One recent study suggests that approximately 60 percent of the Oak Openings land base is now dedicated to agriculture and development combined (Terry Seidel pers. comm.). About 13 percent of this total is under development for housing, industry and the like, and is on the increase. While agricultural land has the potential for habitat restoration, developed land is generally irretrievable. Growing development will contribute to further habitat loss, degradation, and fragmentation. Other side effects of development such as increased efforts at drainage improvement are less measurable, but contribute to habitat degradation. Although a serious problem, adverse impacts on habitat from current land use patterns are partially offset by management of Karner blue habitat on public/private land holdings. Limited acquisition of land by these entities has restored some land to Karner blue habitat. One objective of this plan is to increase awareness among private landowners in the Oak Openings in order to promote effective management of oak savanna on lands that they own.

Climate Change

Several models have been developed to estimate the future range of Karner blue butterfly habitat. According to various predictions and models Karner blue butterfly habitat is expected to shift to the north. As one of the more southern populations of this species this region is in greater risk of losing suitable habitat due to extreme temperatures. While local activities can have a limited impact on climate change there are some actions that can be taken to improve the quality of habitat to mitigate some habitat factors such as average temperature. Increasing heterogeneity by having habitat with different amounts of sun as well as changes in topography will provide a variety of microclimates that can be utilized as conditions change and can help alleviate the weather extremes that have been proposed with climate change.

Restoration Goals

- To reestablish viable populations of the Karner blue butterfly within its historic range in Ohio, and maintain and restore associated species of oak savanna lepidoptera.
- Increase the quantity and quality of oak savanna habitat within the Oak Openings Region.

- Increase public awareness of the Karner blue butterfly and associated lepidoptera, as well as the Oak Openings Region.

Restoration Objectives

- To establish a self-sustaining population of the Karner blue butterfly with a minimum of three metapopulations within the Oak Openings Region, and increase associated lepidoptera in the process.
- To expand current management of oak savanna, and increase the amount of acreage of this habitat under management and protection.
- To produce and distribute educational material for the general public regarding the Karner blue butterfly, associated lepidoptera, and the importance of the Oak Openings Region.

Restoration Needs and Strategies

Re-establishment of Karner blue butterflies will require reintroduction.

Five strategies will be developed and employed: a) establish criteria to evaluate and select release sites; b) develop a source of Karner blue butterflies for reintroduction; c) determine a protocol necessary to establish Karner blue butterflies at reintroduction sites; d) release Karner blue butterflies into selected sites; e) monitor to evaluate release results.

Prior to 1998, establishment of the Karner blue butterfly by reintroduction had never been attempted elsewhere in the United States. Potential reintroduction sites will be ranked based on their estimated ability for sustaining reproducing populations of the Karner blue. A microhabitat analysis will be conducted to procure additional data on Karner blue habitat at Ohio reintroduction sites. Data on habitat site conditions at an area in Michigan where a reproducing population of the Karner blue butterfly exists will be measured and analyzed. Similar data will be taken at potential Karner blue release sites at a preserve located in the Oak Openings Region of Ohio. From this, comparisons between the two sets of data can be made to determine optimum release sites in Ohio. Initially, Karner blues must be obtained from a source out-of-state. The source of Karner blues will be Allegan State Game Area, Michigan. Once obtained, a pool of captive reared Karner blues can be made available for initial and subsequent releases. The Toledo Zoological Society developed captive rearing breeding protocol procedures using *Lycaeides melissa melissa*. These procedures have shown promise of application to captive breeding of the Karner blue. Karner blue populations after release will be monitored for survivorship and reproduction. Protocols addressing Captive Rearing and Propagation are included and described in this plan. These protocols are included in the first edition of the Propagation Handbook for the Karner Blue Butterfly, which was completed in 2010.

Oak savanna, which is essential habitat for the Karner blue butterfly, needs to be increased in quality and quantity for the success of Karner blue reintroduction and establishment in Ohio.

Three areas need to be addressed: a) develop management and monitoring guidelines for oak savanna habitat and lepidoptera associated with Karner blue butterfly; b) implement and expand habitat management and monitoring practices; c) identify and acquire appropriate oak savanna to promote protection and management of this habitat. NOTE: Management and monitoring guidelines have already been developed and the expansion of habitat management and monitoring is in progress.

Generally, when managing for Karner blue habitat, standard management practices like prescribed burning, chemical treatment, and mowing are employed. Timing considerations are critical in employing habitat management practices in Karner blue habitat. Suggested habitat management practices for use by land managers can be found in Appendix A, Management Recommendations for Karner Blue Butterfly Habitat. The techniques recommended provide uniform guidelines for use by land managers in areas where Karner blues are to be released or at sites occupied by the Karner blue butterfly. In addition, the management recommendations are useful for agencies and private landowners who desire to manage oak savanna habitat for Karner blues. Two checklists to assist with identifying site potential suitability for Karner blue habitat management have been developed. A Site Coversheet and Unit Checklist along with attachments are located in Appendix B.

Once identified and evaluated, areas of oak savanna will be considered for acquisition. Land acquisition activities will be guided by availability from willing sellers, cost, and money available for purchase. Donations of land may play a role in increasing oak savanna habitat under agency ownership and management. Several agencies involved with Karner blue habitat management are active or interested in acquiring oak savanna through such means as acquisition, donation, or agreement. Activities related to Karner blue habitat management and acquisition are further described in the section of this plan entitled Responsibilities.

Public awareness and support for Karner blue reintroduction efforts are important for successful recovery.

Three educational needs were identified: a) produce educational materials and programs for distribution and presentation; b) identify and work with interested groups to increase public support; c) continue and promote additional partnerships among public and private agencies and organizations.

The general public, especially residents of the Oak Openings, need to be informed of the importance of restoring the Karner blue butterfly to its former native range in Ohio. Promotion of the recovery effort can be partially accomplished through production and distribution of educational materials. This action would likely assist in locating others willing to participate in the recovery effort of the Karner blue butterfly and its habitats. Working partnerships are necessary if recovery efforts for the Karner blue in Ohio are to succeed. Important partnerships working toward that goal include the Ohio Karner Blue

Butterfly Recovery Team and The Green Ribbon Initiative Committee.

Threats which could negatively impact Karner blue recovery efforts need to be identified and addressed.

Three main areas of concern were identified: a) address the potential impacts of gypsy moth and other insect control programs; b) evaluate the effects of white-tailed deer populations on oak savanna habitat and, if necessary, implement measures to control over population; c) address negative impacts associated with land use development and increasing urbanization.

Large scale insect control programs employ the use of insecticides to control insects that are not desirable to humans and those that can severely damage native vegetation. The most notable insect control program of consequence to Karner blue reintroduction occurring in the Oak Openings is for control of mosquito populations. The Toledo Area Sanitation District regularly controls adult mosquitoes using "mist" or "fog" machines. There is currently a treatment program to control the gypsy moth in the Oak Openings. The Ohio Department of Agriculture has imposed a quarantine on Lucas County due to the presence of the gypsy moth. It is known that white-tailed deer populations graze on lupine and other nectar plants. The effect of deer grazing on Karner blue habitat has not been quantified. Studies may be necessary in order to better understand the impacts of deer on Karner blue habitat. Development and urbanization are serious limiting factors that compete for available Karner blue habitat. Discussion of negative impacts of pesticides, deer, and development can be found under the section of this plan entitled Restoration Potential and Limiting Factors.

Outline of Strategy. Several surveys of the Oak Openings region of Northwest Ohio indicate that the Karner blue was extirpated in northwest Ohio (Magdich 1993). It is highly unlikely that any new naturally occurring populations will be found. If the Karner blue is to persist in Ohio, the likely scenario will involve a two-phase approach utilizing current reintroduction strategies. Phase one will involve intensive management to restore habitat that will support Karner blues. This approach will be community based, using a strategy that will benefit other rare lepidoptera, other fauna, and related plant communities. For example, preliminary findings from 1994 and 1995 transect counts suggested that intensive Karner blue habitat restoration and management work at the Kitty Todd Preserve had a positive impact on the distribution of the frosted elfin, *Incisalia irus* (Magdich pers. comm.).

Phase two involves *ex situ* captive breeding and rearing that will produce butterflies for reintroduction into restored habitat. As the Karner blue is no longer likely to be found in Ohio, no amount of habitat restoration would directly lead to the return of the butterfly. At least two artificial methods are available for restoring an extirpated population. One method involves the direct transference of Karner blues (at any life stage) from a source to restored habitat. A more sound approach, however, relies on *ex situ* captive breeding and reintroduction. This method has been used in at least two other instances involving endangered lepidoptera; the large copper (*Lycaena dispar*) and the large blue (*Maculenea*

rior). Both efforts proved to be very successful (Dresser et. al., 1988; Magdich 1995) and have been in use by the Toledo Zoo since 1998, resulting in restoration of KBBs to five localities in the Oak Openings..

A number of concerns are inherent with any captive-breeding program. These concerns have been addressed at length by the Conservation Breeding Specialist Group (CBSG) of the International Union for the Conservation of Nature (IUCN). The CBSG has established strict guidelines that address these concerns (IUDZG 1993, Magdich 1995). These guidelines are adhered to in formulating an *ex situ* captive breeding strategy for the Karner blue.

Captive Propagation and Reintroduction

A large problem in long-term maintenance of any small animal population in captivity is the constant erosion of genetic diversity by genetic drift. This problem is exacerbated to a very great degree when longevity of the managed population is low and generation time is short. However, the great advantage of producing animals for reintroduction through captive breeding is the prospect of lowered mortality at nearly every stage of the life cycle. In the case of the KBB, significantly lower mortality (as compared to wild populations) can be expected for eggs, larvae, and pupae. Lane and Welch (1994) reported 5% survival of released KBB larvae, compared to 80% survival of KBB larvae raised in captivity. In a study of egg mortality, Spoor and Nickles (1994) found that from 66-95% of unprotected wild eggs monitored in their study were damaged or lost. This contrasts strongly to an egg loss in captivity of 12% as reported by Lane and Welch (1994).

If captive breeding is to be used, the most prudent course of action to take with the KBB is a short-term captive breeding program with a duration of +/- five years designed to maximize numbers of KBBs released into the wild. The short duration of the program, combined with yearly infusions of new founder stocks would minimize erosion of genetic variability and limit the artificial selection for butterflies bred and reared under captive conditions, including yearly collections of eggs from wild populations, captive rearing of the larvae, and the subsequent release of the zoo-raised adults. This is the strategy that has been employed for the past seven years.

Y population numbers of the reintroduced population reach 1000 first flight adults and 3000-4000 second flight adults, the remaining butterflies in captivity would be released and the breeding program terminated

Protocol for Propagation of the host plant *Lupinus perennis* at the Toledo Zoo

Local lupine seed is collected in July before dehiscence is complete. Seed is stored dry in a freezer until the following spring. Immediately before planting seeds are given a tiny nick with a single-edged razor blade and are placed in hot water for 5-10 minutes. Seeds are strained from the water and mixed with a slurry of *Rhizobium* inoculate and milk

(chlorinated water kills the bacteria), type H (Prairie Moon Nursery, Winona, MN) and placed in a clear plastic box for 24 hr. in sunlight. The next day, seeds are planted in starter cells in Bacto™ seed mix. One seed is planted in each cell at a soil depth of ¼ inch. Seeds are watered thoroughly every day until germination. When the first true leaves appear, the plants are transferred to 2-gallon plastic pots in the following soil mix:

- 3-4 parts sand
- 1 part potting soil
- 1 part sphagnum peat
- 1 part small pine bark chips

Plants are maintained in a greenhouse (e.g. the Butterfly Conservation Center (BFCC) at the Toledo Zoo), and are fertilized every week throughout the growing season to increase protein content for larvae. Seedlings are fertilized with diluted fish oil emulsion, while older plants are fertilized using Miracid™ 30-10-30 fertilizer. Some recent research has suggested that protein deficiency reduces lifespan in certain pollen and nectar feeding insects (Schmidt 1998) and that fecundity in some Lepidoptera may be limited by protein obtained as larvae (Stamp et al. 1993) or adults (Labine, 1986; Pierce 1985; Dunlap-Pianka 1995).

Spider mites and white flies commonly infest these plants. In the event of spider mite or white fly infestation the foliage is cleansed with a solution of dish soap (1/4 tsp./cup) and water applied with a spray bottle. Each leaflet is gently scrubbed by hand and the plant thoroughly rinsed with tap water. The treated plants should be quarantined. In stubborn infestations the plants are sprayed with a dilute solution of household bleach (2 tsp. bleach in 32 oz. water), scrubbed, and rinsed with tap water as described above.

Protocols for Collection, Captive Rearing, and Breeding at the Toledo Zoo

Collection

The Karner blue 1st brood flight period usually begins the second week in May at our latitude and lasts for three weeks. We consult with the Michigan Department of Natural Resources staff biologists at the Allegan State Game Area (ASGA) in early May to learn when the flight has commenced. Our first collection begins on a morning one week after the first KBB sighting in the spring at the ASGA. Then a collection date is scheduled one morning each week after that until the adequate number of females has been obtained. A collection of wild caught females is assembled from several different locations to insure genetic diversity. The females are also collected on different dates-spaced approximately

one week apart- to insure that the majority of the females collected were recently emerged and gravid. Our greatest egg production has always been from females collected during the second week of the flight. The females are usually captured with a with a 10 cm x 10 cm x 18 cm transparent, plastic container (AMAC Plastics Products Corp., Sausalito, CA) that is marked with the date and capture locality. A butterfly net is usually not necessary. An artificial nectar source is fastened inside each plastic container consisting of a rubber-capped florist tube filled with a 10% clover honey/water solution with a cotton dental wick protruding through the cap. This strategy allows the butterflies to have access to some nourishment and prevents dehydration during the transport. This is especially important as recently emerged females may not have had a chance to feed.

Transport

The plastic containers are placed within thick-walled 32 quart Styrofoam coolers containing a single ice pack separated from the butterfly containers by bubble-pack insulation. The temperature inside the cooler is maintained at $<20^{\circ}$ C (because of the chill and darkness the butterflies are less active and therefore less likely to batter themselves en route). A digital electronic thermometer with a probe is used to monitor the cooler temperature in real time. Readings are taken every 30 minutes. Following collection and storage, the butterflies are immediately brought back to the holding area at the Zoo. We have maintained a 100% survival rate for collection and transport using this method.

Holding and care of adults

Upon arrival at the Zoo the butterflies are placed into an enclosure consisting of a mesh-covered potted lupine plant in a 2-gallon plastic pot. This covering is a cylinder of white polyester mesh netting # 65-50 (Jason Mills, Westwood, NJ) sewn together with the seams arranged on the outside of the enclosure to assure that none of the butterflies can become trapped in the seam and harm themselves. Lycaenids tend to walk into corners and crevices and may become trapped. The nets fit snugly over the pot rim, and are secured with a # 107 (7" x 5/8" x 1/16") rubber band to prevent escape of butterflies and to deny entrance to predators. Each pot is numbered with a plastic tag identifying each butterfly with a studbook number. It is extremely important that the plants be pesticide-free before exposing butterflies to them. A nectar source is provided from a rubber-capped florist tube with a cotton wick protruding through the cap filled with a 10% clover honey/water solution (the same unit used as artificial nectar source in transport). This is placed in the soil of the potted plant. The artificial nectar source is refilled every day and replaced and disinfected in diluted common household bleach every other day. Disinfected tubes and wicks are rinsed 10x in tap water and 5x in distilled water before being reused. We have discontinued the use of nectar plants in the holding pots and instead recommend daily hand feeding of adults to maximize longevity. In this process, adults are encouraged to climb on the honey-moistened wicks of the feeding tubes. They are then gently placed with the tubes in one of the 10 cm x 10 cm x 18 cm transparent plastic containers used for transport. After the proboscis is withdrawn, the butterflies are placed back into their netted enclosures. For breeding males, a slurry of animal dung should be provided to help provide essential nutrients for the sperm packet.

Wild caught females are monitored every day for egg laying. An official egg count is performed every 2nd day. Eggs are counted by visually inspecting each leaflet and stem of the lupine plant. The undersides of the leaflets are viewed with a dentist mirror. One must make sure that the nectar plants are adequately watered to insure that they are producing nectar. The condition of the host plant and nectar plant is also monitored every other day. We have estimated the ideal carrying capacity of each healthy host plant to be between 10-12 larvae/lupine. After 10 eggs have been laid the female is moved to a new host plant. However, some females may oviposit more than 50 eggs in a single night. Nectar plants that are replaced when the flower heads are spent should be also checked for eggs. We prefer to remove eggs by simply clipping off the area of foliage containing the egg/s and placing it in the host plant pot. In the event that a host plant should become infected with spider mites, the foliage supporting eggs can be gently washed, clipped from the infected plant, and transferred to a healthy host plant. Loose eggs, such as those oviposited on the substrate, can be gently transferred with a damp #2 camel hair artist brush.

It is important to maintain humidity in the enclosures. To prevent dehydration the mesh-covered enclosures are misted by hand.

Cool temperatures and low light intensity may prevent females from oviposition. The enclosures are arranged on shelves in an area with high light intensity and on overcast days quartz lighting is provided. In years when there are low temperatures in late May and early June a large propane heater is also employed to warm the BFCC.

Inventory and holding of larvae/pupae

The wild-caught females are assigned a house studbook number maintained in an informal Microsoft Excel studbook with such information as their capture location, capture date, and fecundity. A running total is kept for all eggs, larvae, pupae, and adults produced by a given female in the studbook. In addition to the studbook, a data sheet is updated for each female each time the eggs, larvae, pupae, or 2nd flight adults are counted. Examples of a studbook page and the data sheets are provided in Appendix A. A numbered plastic tag is attached to the pot of the first mesh-covered lupine plant used. When that lupine plant is replaced for a given female, a secondary number is assigned to the next pot to identify the founder of each individual set of eggs. For example, the first pot for female # 45 would have a numbered metal tag reading "45". After 10-12 eggs/lupine have been laid then the next pot used for that female would be affixed with a plastic tag reading "45A", then, for the next "45B", and so on. This enables us to easily keep individualized founder information on each set of eggs. This also allows us to look back and attempt to determine why a certain set of eggs did not hatch, or why certain pupae lived and others, in a different pot from the same female, did not. See Table I.

The larvae and pupae in each pot are counted and recorded three times a week on the data sheet and a running total is kept for each instar. Condition of larvae and pupae are noted. For example, pupae are green as pupation occurs, transform to a brown color as they age, and finally become semi-transparent when eclosion is imminent. At this time, the adult

coloration, particularly the purple hues of the male, are visible through the semi-transparent cuticle of the pupa.

Larval counts will often fluctuate from day to day, as larvae will disappear, then reappear. They often move in and out of the soil around the root system and between the pot wall and the soil. Larvae are transferred to new host plants as leaves are denuded. It is important not to overcrowd the larvae or to keep larvae of differing sizes on the same host plant. Larger larvae can and will cannibalize their smaller conspecifics. As the larvae approach the 3rd and 4th instars they tend to become more mobile and will often crawl off the plant.

TABLE 1. Informal Studbook for 1st Flight Female Karner Blue Butterflies

Studbook Number	Capture Date	Death Date	Locality	Pot or Enclosure	Number of Eggs	Number of Larvae	Number of Pupae	Number of Adults	As of
116	22-May	13-Jun	Pipeline	116, A, B, C	6	0	0	0	25-May
				D	14	0	0	0	28-May
					15	0	0	0	30-May
					16	0	0	0	1-Jun
					19	1	0	0	4-Jun
					24	9	0	0	5-Jun
					27	10	0	0	6-Jun
					35	13	0	0	8-Jun
					41	15	0	0	11-Jun
					42	30	0	0	13-Jun
					57	36	0	0	15-Jun
					57	36	1	0	20-Jun
					57	43	5	0	22-Jun
					57	47	13	0	25-Jun
					57	47	17	0	27-Jun
					57	47	23	0	29-Jun
					57	47	27	8.1	2-Jul
					57	47	29	9.5	4-Jul
					57	47	30	13.7	6-Jul
					57	47	32	14.8	9-Jul
					57	47	32	15.14	11-Jul
					57	47	32	15.15	13-Jul
					57	47	32	15.16	16-Jul
					57	48	32	15.17	17-Jul

It appears that in the fourth instar the innate behavior to find a perfect place to pupate will drive them to migrate more than usual. In captivity, they can often be found in dangerous places like the outside pot edge, under the pot, up in the net, or on the substrate near the pot. This makes it extremely easy to inadvertently smash the larvae or pupae. For this reason, extra care should be taken during the fourth instars when moving or handling the netted lupine enclosures. When pupation is imminent, pots are provided with several large pine bark chips. Fourth instar larvae often will pupate under these refugia. As soon as second brood adults emerge they are sexed and recorded in the studbook. However, second flight adults are not assigned their own studbook number- they are only identified by their mother's studbook number and locality. A running total of the second flight adults is also kept under the studbook entry for the mother.

Predator control

Predators threaten KBBs in every stage of the life cycle. Spiders are the primary threats to larvae, pupae, and adults. Centipedes, which live in the soil, are a secondary threat. Ants, particularly the tiny *Monomorium emarginatum*, will predate KBB eggs. They may actually cut the egg almost in half, or cut a hole in the egg through which they pull the larva. They are most active in the morning and in the evening. Although *Myrmica sp.* ants protect KBB larvae in the wild, they will also predate the eggs. Trichogrammid wasps parasitize KBB eggs. Up to seven wasp larvae may be deposited in each egg (Spoor, pers. comm.).

No pesticides are ever used in the BFCC or on the host or nectar plants. We depend on vigilance and exclusion tactics to protect our KBBs. Each lupine plant must be thoroughly checked (i.e. examination of each leaflet) for predators before placing a KBB of any life stage upon it. Polyester netting covering the plants excludes predators, but each plant is checked every 2-3 days to ensure that no predators have entered the pots or have hatched from undetected eggs. Any detected predators are simply crushed with our fingers.

Adult care and breeding

Second brood adults are placed into breeding enclosures that are essentially individual camping tents with “no see-um” mesh. (Tropic Screen IIÒ, Bioquip Products, Inc., Gardena, CA). These mesh tents have a nylon floor and are placed on shelving with the BFCC to keep them dry and allow ventilation. This prevents the formation of dangerous pools of water (that will catch and drown small butterflies) or harmful mildew growth. The parabolic shape of the tent prevents the adults from getting caught in corners or on the peak as they might with a conventional tent. The breeding enclosure (mesh tent) is equipped with six large, healthy lupine plants, six large *Lantana camara*, *Pentas sp.* or *Asclepias tuberosa* plants, and two large artificial nectar sources placed on pedestals. These are fashioned from disinfected 4" diameter white scrub pads cut to fit into 4" diameter Petri dishes and then saturated with the 10% clover honey/water solution. Elevating the artificial nectar source on a pedestal prevents the attraction of harmful pests like ants to the breeding enclosure and makes them more visible to the butterflies.

Males and females from the same locality (10.10) are placed within the breeding enclosures for mating and oviposition. Under this system females have the opportunity to serially mate. Serial mating may be important in this species, as we have seen egg fertility decline in subsequent clutches of wild-mated females (See Drummond 1984; Oberhauser 1974; Rutkowski et al 1997; Wannatabe 1988).

Dead adults are removed from the floor of the tent on a daily basis and replaced by new butterflies. It is difficult to count eggs oviposited in the tents because of the potential harm to the breeding adults. Oviposition is estimated by viewing the host plants through the mesh and determining whether or not adequate numbers of eggs have been laid. After the target numbers of eggs are reached for each locality (usually 50 eggs), the remaining second brood adults are released at the reintroduction site. Deaths and daily releases of second brood adults are recorded on a daily basis and tracked on a separate chart and a tag on each tent.

In the 2001 field season we discovered that adult longevity was significantly increased when the adults were hand fed a 10% clover honey solution daily. Butterflies are encouraged, by gently nudging, to walk on the saturated wick of one of our artificial nectar tubes. They usually will immediately commence feeding. Using this technique, we have increased adult survival to as much as four weeks in the breeding facility.

2nd flight egg over-wintering protocol

Data collected from the field at the ASGA indicates that over-wintering eggs in the duff are subjected to very high humidity in the winter, usually 98-100% Relative Humidity (RH) with infrequent spikes to lows of 80 % RH in a near-condensing atmosphere. Temperatures under snow cover are remarkably stable- 0° C to -5° C. Our best 2nd brood hatching success (ca. 40% hatching) has occurred under these conditions. We place our eggs in Mason jars containing a 2" diameter insert constructed from Plexiglas tubing. The tubing has a support of chiffon fabric 1" below the lip of the tubing. To construct this support, a 9" section of tubing is sawed into two pieces- one of 1" length, and one of 8" length. A circular patch of fabric is glued between these two pieces of tube using Silastic aquarium cement. Replacing the dome lid with a chiffon fabric insert glued into the band with silicone aquarium cement further alters the Mason jar and protects the eggs from marauding ants. Ten to 12 eggs are placed in each jar and the jar is labeled with the number of eggs and the collection locality of the parents. Eggs are whitish green when deposited but change color to a dirty gray as they over-winter. This color change is normal. In the extremely hot and dry months of July and August, ca. 200 ml of distilled water is added to the bottom of each jar to keep humidity levels high for the eggs. Care must be taken to ensure that no water condenses around the eggs as the chiffon fabric insert in the band may inhibit evaporation, particularly under rainy conditions when ambient RH is high. Lids can be removed from jars with condensation to allow condensed water to evaporate. Jars should never be left without tops overnight, as the eggs may be predated or parasitized. Jars can be placed in a shaded location protected from rain. We prefer to bury the jars, protected by covering them with a sheet of polyfilm, beneath snow cover when possible.

Release numbers. There are clearly differences in opinion of what population numbers constitute a minimum viable population of KBBs, and how resources should be partitioned to optimize the probability of recovery. Schweitzer (1994) is a clear proponent of a triage system, and posits that only populations of >1,000 second-flight adults or >250 first-brood adults have potential for recovery and long-term management. He suggests that the focus of KBB efforts be directed towards these sites. Andow et al. (1994), citing the rapid demise of the large Ontario population in the Point Franks area, point out that population size is not necessarily a predictor of population persistence, and argue that diversity of populations should be preserved, including small populations that are genetically unique, occur in unique habitat, or are geographically disjunct. Several demes have persisted (many of which are obviously declining) for years at several western localities within Indiana (Martin 1994), Michigan (Wilsman 1994), and Wisconsin (Bleser 1994). The persistence of these small populations is evidence that a reintroduced population may persist at a sub-optimal level until enough augmentation occurs to bring the population to a level >1,000 first flight adults.

According to Schweitzer (1994), restoration efforts should aim for a metapopulation of at least 5 demes with scattered stands of lupine and nectaring plants between them, each with >1,000 first flight adults. A maximum of 40 females may be captured annually from the for an additional two to four years. Annual captures will be dependent upon the abundance of KBBs in Allegan and will be closely coordinated with the Michigan Department of Natural Resources.

Release Protocol. Second brood adults that have previously been in breeding enclosures or are freshly eclosed are transported to the reintroduction site in a mesh-covered pot containing lupine and a nectar plant. They are released in early afternoon in fair to good weather conditions in an area where there are adequate nectar and host plants.

Evaluation of Release Sites

Site selection - Sites on KTP were chosen to represent a spectrum of lupine habitat, including mature oak savanna (Oak Dune, Julia's Savanna), lupine partially shaded by secondary forest (Bond Tract) and lupine in full sun on essentially treeless dunes (North Piels, South Piels). These sites included one which formerly supported populations of the Karner blue (Bond Tract), two which were not known to have KBBs but which support populations of the frosted elfin, *Callophrys irus*, and the Persius dusky wing, *Erynnis persius* (Oak Dune, Julia's Savanna), and two which have extensive patches of lupine but which do not support populations of any lupine-dependent butterflies (North Piels, South Piels). Data was collected concurrently in the Allegan State Game Area, Allegan County, Michigan, at three sites that support reproducing populations of the KBB (42nd St., Gun Club, and Pipeline). Sites were chosen in the Allegan State Game Area based on their similarity in vegetation structure and species composition to those sites on the Kitty Todd

Preserve that once supported populations of the KBB.

Methodology - Percent canopy cover and density, frequency, and phenology of lupine and nectar plants were quantified at the sites described above. These data were collected in randomly selected 0.5m² quadrats using the transect-quadrat method of Bonham (1989) at the density of one transect/850m² (Papp 1996). Density of lupine was calculated as the number of lupine stems/m² within each quadrat. Brood 1 and brood 2 nectar plant densities were calculated as the number of flowering stems of nectar plants/m² within each quadrat (see Tables II and III for species lists of first and second brood nectar plants at KTP and the ASGA). Canopy cover was calculated using a crown densiometer. The number of hits per transect (one reading for each quadrat) were divided by the total number of quadrats at the site to give the percentage of canopy cover (Tolson 1998).

TABLE II. INVENTORY OF BROOD 1 NECTAR PLANTS AT ASGA AND KTP UTILIZED BY THE KARNER BLUE BUTTERFLY

Species	Common name	Present at ASGA	Present at KTP	Exotic
<i>Amelanchier spicata</i>	Dwarf serviceberry	?	Yes	No
<i>Arabis lyrata</i>	Lyre-leaved rock cress	Yes	Yes	No
<i>Arenaria stricta</i>	Rock sandwort	Yes	?	No
<i>Berteroa incana</i>	Hoary alyssum	Yes	?	No
<i>Fragaria virginiana</i>	Wild strawberry	Yes	Yes	Yes
<i>Geranium maculatum</i>	Wild geranium	?	Yes	No
<i>Helianthemum canadense</i>	Frostweed	Yes	Yes	No
<i>Hieraceum pillosella</i>	Mouse-ear hawkweed	Yes	No	No
<i>Krigia virginica</i>	Dwarf dandelion	Yes	Yes	No
<i>Lithospermum canescens</i>	Hoary puccoon	?	Yes	No
<i>Lithospermum caroliniense</i>	Golden puccoon	Yes	Yes	No
<i>Lupinus perennis</i>	Wild lupine	Yes	Yes	No
<i>Potentilla sp.</i>	Cinquefoil sp.	Yes	Yes	No
<i>Rosa carolina</i>	Rose	Yes	Yes	Yes
<i>Rubus sp.</i>	Dewberry	Yes	Yes	No
<i>Tephrosa virginiana</i>	Goat's rue	Yes	Yes	No
<i>Viola pedata</i>	Bird's foot violet	Yes	Yes	No

TABLE III. INVENTORY OF BROOD 2 NECTAR PLANTS AT ASGA AND KTP
UTILIZED BY THE KARNER BLUE BUTTERFLY

Species	Common name	Present at ASGA	Present at KTP	Exotic
<i>Achillea millefolium</i>	Yarrow	Yes	Yes	Yes
<i>Asclepias tuberosa</i>	Butterfly milkweed	Yes	Yes	No
<i>Asclepias verticillata</i>	Whorled milkweed	Yes	Yes	No
<i>Baptisia tintoria</i>	Yellow indigo	Yes	Yes	No
<i>Ceanothus americanus</i>	New Jersey tea	Yes	Yes	No
<i>Centaurea maculosa</i>	Spotted knapweed	Yes	No	Yes
<i>Coreopsis lanceolata</i>	Lance-leaved coreopsis	Yes	Yes	No
<i>Dianthus armeria.</i>	Deptford pink	Yes	Yes	Yes
<i>Erigeron annuus</i>	Daisy fleabane	Yes	Yes	No
<i>Euphorbia corollata</i>	Flowering spurge	Yes	Yes	No
<i>Helianthus divaricatus</i>	Woodland sunflower	Yes	Yes	No
<i>Helianthus occidentalis</i>	Western sunflower	Yes	Yes	No
<i>Hieraceum aurantiacum</i>	Orange hawkweed	Yes	No	Yes
<i>Hieraceum pratense</i>	Yellow hawkweed	Yes	No	Yes
<i>Hypericum perforatum</i>	St. Johnswort	Yes	Yes	Yes
<i>Lespedeza sp.</i>	Bush clover	Yes	Yes	No
<i>Liatris aspera</i>	Blazing-star	No	Yes	No
<i>Liatris cylindracea</i>	Cylindric blazing-star	Yes	No	No
<i>Lotus corniculatus</i>	Birdsfoot trefoil	Yes	?	No
<i>Monarda fistulosa</i>	Wild bergemot	Yes	Yes	No
<i>Monarda punctata</i>	Dotted horsemint	Yes	Yes	No
<i>Polygala polygama</i>	Racemed milkwort	Yes	Yes	No
<i>Rudbeckia hirta</i>	Black-eyed Susan	Yes	Yes	No
<i>Solidago sp.</i>	Goldenrod	Yes	Yes	No
<i>Specularia perfoliata</i>	Venus looking-glass	Yes	Yes	Yes
<i>Vicia cracca</i>	Cow vetch	Yes	?	Yes

Remote computerized data loggers were programmed to take data readings every 30 minutes for surface temperature, solar radiation, and relative humidity at the level of the lupine crowns (i.e. ca. 5.0 cm above soil surface). Equipment used was Onset Computer Corp.'s StowAway temperature logger model STIB-37+46, StowAway relative humidity logger model SRHA-32, and Hobo light intensity logger model HLI. Each site had one each of the listed data loggers. Data were downloaded weekly, using the Onset Computer Corp. Stowaway and Logbook software, to a laptop computer. Percent canopy cover of oak and invasive secondary forest was also quantified at each site. Canopy readings were taken weekly over the season of activity for the KBB (normally May-July) as the canopy emerged.

Analysis - Data on nectar plant resource availability were recorded and analyzed separately for first and second brood KBBs. Comparisons between locations (Michigan and Ohio) were made using an independent measures t-test and analysis of variance (ANOVA). Tests were performed to determine differences among sites within each location. ANOVA was followed up with the Tukey test to determine which sites within ASGS and KTP varied from each other. The two highest potential reintroduction sites on KTP, i.e. those with the highest mean densities of lupine and nectar plants (Bond Tract, Julia's Savanna), were compared with each of the ASGA sites independently using an independent measures t-test.

Site Selection References

Following habitat management recommendations provided (Appendix A) are not only necessary for sites occupied by Karner blue butterflies, but can improve the potential for a given site's occupation by the butterfly. Indications of a site's potential suitability for inhabitation by Karner blue butterflies can be obtained through visual analysis of specific habitat characteristics present.

Site characteristics include, but are not limited to, vegetative qualifiers alone (nectar species presence and abundance, ground and canopy cover, lupine, etc.). Other site characteristics such as protection or preservation and potential general threats to the sites existence, etc., can impact Karner blue butterfly suitability and should be taken into account. Appendix B provides a habitat manager/landowner with a basic technique for evaluating Karner blue butterfly habitat suitability through listing and identifying habitat criteria in a checklist format.

Monitoring

Monitoring for 1st flight KBBs begins approximately the third week in May. The transect

area is searched each day except in the rain until no butterflies have been sighted for at least three days. It is then suspended until the 2nd brood adults emerge, approximately 28 days after the 1st flight. Then monitoring resumes again in the same fashion until three days after the last 2nd flight KBB has been seen. Emigration from the release site is determined by carefully walking a transect route for each site in our reintroduction area with significant stands of lupine. The transect areas are always searched by two spotters. The primary release site is the major transect area. This area has a plot of 120m x 100m with transect widths of 10m. In this primary area a spotter walks every 5m in alternating directions with each other. Secondary transect sites consist of ca.20m wide strips. The route went through the sites, alternating direction from one strip to the next until the entire site was covered. Sightings of KBBs are plotted on a topographic map of the preserve.

Current Release Sites

In order to meet the stated objective of establishing five metapopulations of Karner blue butterflies in the Oak Openings Region, additional release sites throughout the region will be necessary. Site selection of these release sites will be determined using similar methodologies as were used at the current Kitty Todd Preserve release location(s). Currently there are multiple locations where the Karner blue butterfly has been released. These include Julia's Savanna (The Nature Conservancy), Bond tract (The Nature Conservancy), Moseley Barrens (The Nature Conservancy), the Louis Campbell Prairie/South Wilkins (Metroparks of the Toledo Area – Oak Openings Preserve), and the Meilke Road Savanna Wildlife Area (Ohio Division of Wildlife). Other potential release sites may become available through future purchases or response of presently held tracts to oak savanna habitat management.

In addition to these areas of release the Karner blue butterfly has dispersed to other areas as it has been observed at Cactus Hill Prairie (The Nature Conservancy).

Research Suggestions

Studies have suggested that deer browsing levels should be limited to less than 15% of lupine. Herbivory in excess of this level should be addressed. Currently there is only anecdotal information on herbivory within the Oak Openings region. It would be useful to identify what the current levels of herbivory are and determine if action is required to address this threat.

Responsibilities

The Ohio Karner Blue Butterfly Recovery Team (OKBBRT) will coordinate the strategy for the recovery of Karner blue in Ohio. The Team is represented by several

conservation organizations with expertise in habitat management and restoration, wildlife management, community ecology, lepidoptera, entomology, and captive breeding. The Ohio Karner Blue Butterfly Team will act as the Ohio liaison with the Federal Karner Blue Recovery Team that was formed by the United States Fish and Wildlife Service to coordinate all recovery efforts for the Karner blue in the United States. **Currently, the Federal Recovery Team has designated Ohio as a Potential Recovery Unit for the Karner blue butterfly which means that recovery in Ohio is not necessary for delisting of the species.**

UNITED STATES FISH AND WILDLIFE SERVICE



The U.S. Fish and Wildlife Service (FWS, hereafter) and the National Marine Fisheries Service are the two Federal agencies responsible for implementing the U.S. Endangered Species Act (ESA). The FWS implements the ESA through activities that involve listing a species as threatened or endangered (ESA Section 4), recovery of listed species (ESA Section 4), grants to state resource agencies for species projects (ESA Section 6), land acquisition (ESA Section 5), project or program consultations with Federal agencies and their partners (ESA Section 7), law enforcement (ESA Section 9), and permits (ESA Section 10) that sometimes include Habitat Conservation Plans. Thus, the FWS can use its regulatory authority under the ESA to assist Oak Openings area partners in implementing a number of Karner blue recovery activities.

The Columbus, Ohio Field Office of the FWS will assist with Karner blue and Oak Openings recovery in several ways. The Ohio FWS office will serve as a liaison with the Federal Karner Blue Recovery Team, helping to coordinate Ohio activities with the Federal Karner Blue Recovery Plan. The Ohio FWS office can assist the Ohio Division of Wildlife with ESA Section 6 grants and other Federal funds to implement recovery projects for the Karner blue in northwest Ohio. The Ohio FWS office can help protect Karner blues and their habitat by consulting (ESA Section 7) with Federal agencies or their designees on projects that may affect the Karner blues or their habitat. A Federal designee is an organization that implements the ESA on behalf of the Federal government (e.g., the Ohio Department of Transportation) while partners, or those who consult, implement a project using Federal funds (e.g., a developer building apartments using Federal housing funds). The Ohio FWS office can also assist Oak Openings area agencies and landowners with ESA permit compliance and law enforcement support, if necessary.

OHIO DEPARTMENT OF NATURAL RESOURCES

Division of Wildlife



MISSION STATEMENT

TO CONSERVE AND IMPROVE FISH AND WILDLIFE RESOURCES AND THEIR HABITATS FOR SUSTAINABLE USE AND APPRECIATION BY ALL.

The Division of Wildlife is the state agency responsible for management of Ohio's fish and wildlife resources. The Division operates under a broad set of authorities found in the Ohio Revised Code. A portion of the Revised Code states that the Division of Wildlife holds title to all wild animals, which are not legally confined or held in private ownership, in trust for the benefit of all Ohioans. The Revised Code further directs the Division to plan, develop, and institute programs and policies that are designed for the general care, protection, and supervision of the wildlife resource in the state. The Division is also empowered to develop and enforce regulations for the protection, preservation, propagation, management, and wise use of wild animals and specific plant(s).

As part of this direction, the Division of Wildlife created a Strategic Plan to help guide the Division and its activities. One of the broad strategic issues identified in the plan addresses management and restoration of specific habitats such as forest, grassland, wetland, and unique habitats. Oak savannas of the Oak Openings region of northwest Ohio is one of the habitats clearly identified in the Unique Habitats Tactical Plan. The Division plans to “enhance, restore, and connect fragmented oak savanna habitat”, particularly to sustain four endangered wildlife species which are limited to this habitat. The Karner blue butterfly is one of these endangered species.

The Division of Wildlife will coordinate the Karner blue butterfly restoration effort, including assisting with oak savanna habitat restoration and enhancement, obtaining USFWS approval for the reintroduction of Karner blues in Ohio, coordinating with partners, providing funding for the program, obtaining permits for securing and moving Karner blues from Michigan, assisting with preparation of informational and educational materials, preparing all necessary progress and final reports, and providing law enforcement for protection of Karner blue release sites. The Division may also acquire habitat for the Karner blue, such as the Meilke Road Savanna Wildlife Area, which has been identified as a potential reintroduction site for the Karner blue.

Division of Forestry



The Division of Forestry manages the 3,100-acre Maumee State Forest, located in the Oak Openings area. The forest

is composed of several parcels located in Fulton, Henry and Lucas Counties. Several small populations of wild lupine have been found within the state forest, primarily on exposed sandy soils. The Division of Forestry is part of the Green Ribbon Initiative Committee. The Maumee State Forest is managed under a multiple use/ecosystem management approach for timber, wildlife, recreation, soil and water protection, and for the protection of rare flora and fauna species as well as their habitat. The Division of Forestry has a Cooperative Management Agreement with the Division of Natural Areas and Preserves to manage a 40-acre wet sedge meadow site on the forest, using mowing, manual cutting with stump treatment and controlled burning. The two Divisions will continue working together to review the lupine sites within Maumee State Forest and consider management approaches.

Division of Natural Areas and Preserves



The Division of Natural Areas and Preserves owns and manages two preserves in the Oak Openings, Irwin Prairie and Louis W. Campbell State Nature Preserves. Campbell Preserve, encompassing 170 acres, contains approximately 80 acres of oak woods, savanna, and small sand prairie openings. The Division has been intensively managing these areas to control woody species using manual cutting, herbicide treatments, and controlled burning since 1984. Four small openings, approximately 5 acres total, contain wild lupine. While these openings are small and need more nectar plants for Karner blue butterfly habitat, the preserve has potential, especially when considered in conjunction with adjacent Toledo Express Airport lands. The Division will continue management efforts to perpetuate the overall diversity of plant and animal species. If the site were chosen as a Karner Blue reintroduction site, additional measures could be undertaken to further enhance the quality of butterfly habitat.

The Division has funded and/or coordinated several efforts involving the Karner blue butterfly since 1988. Three grants were funded by the Division's Natural Areas Research Grants Program: 1) a survey for Karner blues by Mitch Magdich in 1988 documented the last 3 sitings; 2) a follow-up survey for Karner blues by Margaret Bresnahan in 1989; and 3) a propagation project for lupine and nectar plans by The Toledo Zoo in 1993. In addition, during 1989-1992, Division staff and volunteers conducted surveys for the Karner blue at Campbell Preserve and the Toledo Express Airport.

The Division maintains the Ohio Natural Heritage Database, which contains records of rare species, plant communities and natural features in Ohio. This database contains information on many areas in the Oak Openings, including locations of lupine, which is a potentially threatened species in Ohio.

The Division was involved in habitat management at the Meilke Road Savanna, which is approximately 60 acres of oak woods, oak savanna and sand barrens located not far from Kitty Todd Preserve. It contains a large lupine population,

and is owned by the Spencer Township Trustees as well as several private landowners. The Division obtained a management agreement with the township for their 15 acres. A small grant was obtained from the US Fish and Wildlife Service to manage for woody species on this property. Management activities included the removal of woody and non-native species using cutting and herbicide treatment. The Division also conducted management activities on one of the privately owned parcels, now owned and managed by the Division of Wildlife as the Meilke Road Savanna Wildlife Area as of 2004.

TOLEDO-LUCAS CO. PORT AUTHORITY/TOLEDO EXPRESS AIRPORT



The Toledo-Lucas County Port Authority operates the Toledo Express Airport, which contains approximately 100 acres of sand barren habitat including several large populations of wild lupine. The Port Authority has allowed the Ohio Department of Natural Resources (ODNR) to conduct species inventories on 2,500+ acres of airport lands since 1989 (specifically with the Division of Natural Areas & Preserves during 1989-1997 and recently with the Division of Wildlife since 2002). More than 75 state-listed plants and animals have been recorded from airport lands. The Port Authority has cooperated with ODNR on requests for inventories, collection of lupine seeds, controlled burns, and some modifications to construction plans. Most recently, the Division of Wildlife has provided habitat management recommendations for specific high-quality areas on airport lands, including the only known site for the state endangered purplish copper butterfly. Several sites on airport lands may be suitable for Karner blue butterfly introduction in the future.

METROPOLITAN PARK DISTRICT OF THE TOLEDO AREA



METROPARKS
T O L E D O A R E A

Your Clean, Safe, Natural Places To Be

Past recovery activities: Beginning in 1987, the Metroparks took an active role in monitoring the Karner blue butterfly in Ohio with the formation of a Lupine Hotline and subsequent survey of high quality sites for the butterfly in northwestern Ohio. In 1988-89, the Metroparks assisted in a grant from the ODNR Division of Natural Areas and Preserves (DNAP) to thoroughly survey the potential Karner blue sites and have helped

coordinate volunteer and staff surveys for the Karner blue, lupine strongholds and nectaring sources from 1988 to the present.

The Park District began an intensive land management program of Metropark oak savanna restoration in 1988 using fire and selective cutting to remove canopy cover from the degraded units. The District has been involved in several studies of *Lupinus perennis* on our park lands, attended many of the Karner blue workshops and meetings, and put together documentation, with DNAP and the Ohio Lepidopterist Society, on the history of the Karner blue in Ohio. Metroparks established a long-term community-monitoring program for our oak savanna units and participated in the formation of the EPA's oak ecosystem restoration draft plan as well as annual conferences on this ecosystem in the Midwest. In an attempt to reduce non-target larva viding of Lepidoptera and especially rare butterflies and moths, during the gypsy moth outbreaks, the Metroparks also introduced the fungus, *Entomophaga maimaiga*, as a bio-control in Lucas County.

Current recovery activities: The Park District actively manages its best savanna units as an oak savanna ecosystem. This community type supports many other rare invertebrates birds and plants besides the Karner blue butterfly, such as the antenna waving wasp (*Tachysphex pechumani*), Persius dusky wing (*Erynnus persius*), Edward's hairstreak butterfly (*Safyrium edwardsii*), the lark sparrow (*Chondestes grammacus*). A current list of rare plants monitored is available through the Metroparks and ODNR Division of Natural Areas and Preserves. One third of all rare species in Ohio occur in the Oak Openings region. Metropark research through two butterfly transects (in cooperation with Ohio Division of Wildlife, Ohio Lepidopterists and the Cleveland Museum of Natural History) compliments the Karner blue work. One transect runs through the Campbell Prairie and adjacent units, and the second is located at the last known location of Karner blue before it was extirpated in the park.

Management to increase the extent of oak savanna continues. The 3,700-acre Oak Openings Preserve Metropark is the site of the greatest management activity and is the historic site for the Karner blue in the park district. There are approximately 250 acres of oak savanna currently under management at this site, mostly in 30 to 40 acre units.

The Park District also cooperates with The Toledo Zoo and The Nature Conservancy. From research and management techniques to public education, joint on-going efforts about the Oak Openings region and the Karner blue helps solidify the public's awareness and support for recovery. The Karner blue symbolizes the need to preserve and manage the best areas of the Oak Openings.

Metroparks is also part of the Green Ribbon Initiative Committee composed of public and private agencies, who meet to discuss cooperative preservation of and education about the Oak Openings region.

Future recovery activities: Metroparks is committed to managing for the oak savanna community and its dependent species. In 2001-02, research by staff from the Toledo Zoo helped the Metroparks determine habitat quality for Karner blue at the Lou Campbell Prairie unit on S. Wilkins Road. Increased nectaring sources are still needed. The

Metroparks have been collecting seeds from adjacent units and planting the needed plants with a goal of re-establishment of the butterfly by 2005. For the Karner blue to fully utilize the current management units with Oak Openings Preserve and adjacent natural areas, corridors have also been created and managed. The Karner blue butterfly existed for many years along a railroad right-of-way and an adjacent 200-acre savanna within Oak Openings Preserve. Metroparks also has a long-term plan to provide a connecting biological corridor between Secor and Oak Openings Metroparks linking Kitty Todd Preserve with the corridor. In addition, Metroparks has acquired additional habitat at West Winds Industrial Area just to the south of Kitty Todd. Additional acreage could be added to the management plan to increase suitable area for demes of a metapopulation of Karner blue as details on minimum acreage for the butterfly become available.

THE OHIO CHAPTER OF THE NATURE CONSERVANCY



The Nature Conservancy's overall objective within the 130-square mile region of Ohio's Oak Openings is to initiate and facilitate the conservation of the natural ecosystem. Our efforts are focused on four primary levels:

Land acquisition: The Conservancy maintains one preserve within the Oak Openings Region, the 900-acre

Kitty Todd Preserve (KTP). Within the preserve's potential acquisition area is the region's best unprotected contiguous remnant wet prairie, oak savanna, sand barren. The preserve and the surrounding area also supports the best concentration of Karner blue habitat within the region. Approximately 700 acres of the 1500 acre ultimate potential preserve area could, with management, provide Karner blue habitat. Additions to the preserve are actively being pursued from willing sellers.

Habitat management: The Conservancy has been managing the Kitty Todd Preserve for oak savanna, sand barren and wet prairie since the initial acquisitions in the 1970s. Management objectives include the restoration and maintenance of all the components that comprise these systems. Habitat requirements for the Karner blue butterfly are considered when management objectives are set and techniques are implemented. Specific management techniques include prescribed burning, mowing, hand cutting, spot herbicide applications, seeding, hand planting and hydrologic restoration. Currently, approximately 130 acres of the preserve contain suitable Karner blue habitat.

The Karner blue was re-introduced to the preserve's Julia's Savanna Management Unit beginning in 1998 and additional releases took place annually through 2003. In 2004, the Ohio Recovery Team decided not to release more butterflies at this site in order to determine if the preserve contained a self-supporting population. Since the initial release, the Karner blue has colonized the South Piels Management Unit where intensive habitat restoration has significantly reduced the amount of the non-native smooth brome (*Bromus inermis*). This has resulted in a dramatic increase in the amount of lupine at

that site. Many additional nectar sources have also been planted. In 2004, Karner blues were released on the Bond Dune located within the Bond Management Unit. This site contains a large lupine population and habitat restoration has increased the number of nectar sources. However, KBB have not been observed on Bond Dune for several years. Also in 2004, the Karner blue colonized the Oak Dune located within the Oak Dune Management Unit as of 2010 a few KBB are observed each season. This site contains a natural lupine population and abundant nectar sources. Thousands of lupine seeds have been planted in the last several years which has greatly increased the number of lupine at this location.

Intensive restoration work has also taken place at the preserve's Moseley Barrens and Moseley Savanna Management Units within the last several years. The tree canopy has been restored on approximately 100 acres within these units and thousands of lupine and nectar sources have planted to prepare the site for Karner blue re-introduction. The Ohio Karner Blue Recovery Team selected Moseley Barrens as the location to establish a new population of Karner blues beginning in 2005. As of 2010 Moseley Barrens contains by far the greatest concentration of KBB at Kitty Todd Preserve. Management of the area consists of burning and mechanical brush removal in the adjacent Moseley Savanna area to the East and West of the occupied habitat. There are dunes within the savanna that contain lupine but very high shrub densities threaten to shade out these lupine populations.

The Cactus Hill Prairie (aka Sweetfern) has recently been colonized by KBB. In 2009 a single individual was observed and in 2010 several male and female KBB were observed. The corridor by which butterflies arrived at the site is unknown. Adjacent areas within the Sweetfern Savanna were burned in the spring of 2011 and it is thought that up to 15 acres of this site could be suitable for KBB at this time.

Several other management units on the preserve contain potential Karner blue habitat including the Curl property (purchased in 2010) and portions of the Linnenkugel property (purchased in 2009). These sites are also being intensively managed for future Karner blue populations.

Monitoring: In order to evaluate the possible impacts and results of our habitat management, The Conservancy utilizes both pre-management and post-management monitoring, which is conducted by staff, volunteers and researchers. Savanna butterflies and the plants they depend upon are an important component of the monitoring efforts at the Kitty Todd Preserve. In 2011 volunteers will begin to monitor seven sites (Moseley Barrens, Wahl Tract, Cactus Hill prairie, Bond tract, Oak Dune, Julia's Savanna and South Piels) for KBB. We believe that the number and distribution of KBB at KTP could have been recently underestimated due to lack of rigorous survey.

Region wide education and protection: Outside of the boundaries of the Oak Openings Region's parks and preserves are numerous areas of significant unprotected habitat. Portions of this habitat could be suitable for the Karner blue butterfly. The Conservancy is working with a variety of partners to increase the possibility of protecting more of these through a citizen-based conservation effort known as the Green Ribbon

Initiative. The general objective of the initiative is to foster local support for conservation of the region and to work to protect an additional 6,000 acres of the region's remaining high quality habitat. This Initiative has the potential to have significant long-term benefits for the Karner blue butterfly.

The Nature Conservancy is committed to the concept of restoring and maintaining a viable population of Karner blue butterflies in the Oak Openings Region.

THE TOLEDO ZOOLOGICAL SOCIETY



The Toledo Zoological Society is committed to the recovery of populations of oak savanna butterflies in northwestern Ohio, most notably the Karner blue butterflies. Selected activities will include:

1. Development of protocols for breeding and rearing lupine-feeding Lycaenids in captivity, including the Karner blue butterfly. This information will be used to produce captive-born butterflies for release into suitable Oak Openings habitat.
2. Continued production of lupine and first and second-brood nectaring plants from local stock to be used as food sources for captive populations of endangered butterflies and for transplantation into the wild.
3. Continued habitat management in the Oak Openings to improve conditions for native butterflies, including removal of invasive exotic plants and planting of additional nectaring plants in selected butterfly habitat.
4. Continued surveying and monitoring of endangered butterfly populations in the Oak Openings of Northwestern Ohio and Southeast Michigan, including long-term monitoring of reintroduced Karner blue butterflies.
5. Continued education initiatives for the Karner blue and other endangered Ohio butterflies, including exhibits, public lectures, educational and conservation publications, and materials distributed to local schools.
6. Continued coordination of the oak savanna butterfly recovery activities in Northwestern Ohio, including liaisons with the U.S. Fish and Wildlife Service, the Ohio Department of Natural Resources, and other agencies critical to protection of butterflies and their habitat.