



United States Court of Appeals,
Seventh Circuit.

SIERRA CLUB, Wisconsin Forest Conservation Task
Force and Wisconsin Audubon
Council, Incorporated, Plaintiffs-Appellants,

v.

Floyd J. **MARITA**, as Regional Forester of the Eastern Re-
gion of the Forest
Service, United States Department of Agriculture, et al., De-
fendants-Appellees.

Nos. 94-1736, 94-1827.

Argued Oct. 7, 1994.

Decided Jan. 20, 1995.

Rehearing Denied April 5, 1995.

Environmental organization brought action against United States Forest Service, seeking to enjoin timber harvesting, road construction or reconstruction, and creation of wildlife openings at two national forests, claiming that Service violated environmental statutes and regulations in developing forest management plans by failing to properly consider certain ecological principles of biological diversity. The United States District Court, Eastern District of Wisconsin, John W. Reynolds, J., [843 F.Supp. 1526](#), [845 F.Supp. 1317](#), granted summary judgment in favor of Forest Service, and conservation group appealed. The Court of Appeals, Flaum, Circuit Judge, held that: (1) conservation group had standing, and claim was ripe, but (2) Forest Service did not violate National Environmental Policy Act (NEPA) or National Forest Management Act (NFMA), or regulations thereunder, in connection with Service's consideration of and decision not to implement conservation biology principles.

Affirmed.

West Headnotes

[1] Federal Civil Procedure **103.2**
[170Ak103.2 Most Cited Cases](#)

[1] Federal Civil Procedure **103.3**
[170Ak103.3 Most Cited Cases](#)

Constitutional minimum for Article III standing contains

three elements: actual or imminent invasion of concrete and particularized legally protected interest, i.e., "injury in fact"; causal connection between defendant's actions and injury; and likelihood that injury is redressable by favorable court decision. [U.S.C.A. Const. Art. 3, § 2, cl. 1.](#)

[2] Environmental Law **652**
[149Ek652 Most Cited Cases](#)

(Formerly 41k20(1))

Environmental organization had standing to assert that Forest Service had acted arbitrarily or capriciously in developing forest management plans and final environmental impact statements (FEIS), despite claim that plans and FEIS's were programmatic and did not themselves implement anything or specify that any particular activity happen, such that there was no imminent injury; plans required certain projects to be undertaken and indicated what their effects could be, if organization had to wait until project level to address general procedural injuries regarding broad issue such as biological diversity, implementation of forest plan might have progressed too far to permit proper redress, and arguments over plans' sufficiency as whole or procedures followed in developing plans with regard to diversity were currently as concrete as they would ever become. [U.S.C.A. Const. Art. 3, § 2, cl. 1](#); National Environmental Policy Act of 1969, § 2 et seq., [42 U.S.C.A. § 4321](#) et seq.; [36 C.F.R. §§ 219.1\(b\), 219.10\(e\)](#).

[3] Federal Civil Procedure **103.2**
[170Ak103.2 Most Cited Cases](#)

Constitutional standing requirements guarantee that courts do not decide abstract principles of law but, rather, concrete cases and controversies. [U.S.C.A. Const. Art. 3, § 2, cl. 1.](#)

[4] Woods and Forests **8**
[411k8 Most Cited Cases](#)


Sufficiency of forest management plan may be challenged at time of site-specific action, if appropriate.

[5] Administrative Law and Procedure **704**
[15Ak704 Most Cited Cases](#)

[5] Woods and Forests **8**
[411k8 Most Cited Cases](#)

Environmental organization's claim challenging issuance of

final management plan which would, unless amended, direct Forest Service management activities in two national forests was ripe for review; organization was not required to wait to challenge specific project when its grievance was with overall plan. [36 C.F.R. § 219.10\(d\)](#).

[6] Administrative Law  **750**

[15Ak750 Most Cited Cases](#)

Party challenging agency action under Administrative Procedure Act (APA) bears burden of proof. [5 U.S.C.A. § 706\(2\)\(A, D\)](#).

[7] Environmental Law  **604(2)**

[149Ek604\(2\) Most Cited Cases](#)

(Formerly 199k25.10(6.4) Health and Environment)

[7] Woods and Forests  **8**

[411k8 Most Cited Cases](#)

Forest Service's management plans and final environmental impact statements (FEIS) for two national forests were not inadequate for failure to implement principles of conservation biology in connection with diversity analysis required under NFMA and NEPA; conservation biology was not necessary element of diversity analysis insofar as regulations did not dictate that Forest Service analyze diversity in any specific way. Forest and Rangeland Renewable Resources Planning Act of 1974, § 6(g)(3)(B), as amended, [16 U.S.C.A. § 1604\(g\)\(3\)\(B\)](#); National Environmental Policy Act of 1969, § 101, [42 U.S.C.A. § 4331](#); [40 C.F.R. § 1508.8](#).

[8] Environmental Law  **604(2)**

[149Ek604\(2\) Most Cited Cases](#)

(Formerly 199k25.10(6.4) Health and Environment)

[8] Woods and Forests  **8**

[411k8 Most Cited Cases](#)

Substantive law of diversity did not necessitate that Forest Service, in forest management plans and final environmental impact statements (FEIS), set aside large, unfragmented habitats to protect old-growth forest communities; regulations did not require promotion of "natural forest" diversity, but, rather, promotion of diversity at least as great as that found in natural forest, and to extent Service's final choice did not promote natural diversity above all else, Service ac-

ted within its regulatory discretion. Forest and Rangeland Renewable Resources Planning Act of 1974, § 6(g)(3)(B), as amended, [16 U.S.C.A. § 1604\(g\)\(3\)\(B\)](#); National Environmental Policy Act of 1969, § 101, [42 U.S.C.A. § 4331](#); [36 C.F.R. § 219.27\(g\)](#).

[9] Environmental Law  **604(2)**

[149Ek604\(2\) Most Cited Cases](#)

(Formerly 199k25.10(6.4) Health and Environment)

Forest Service was not shown to have failed in its responsibility under NEPA to utilize "high quality" science in preparing environmental impact statements (EIS) and evaluating diversity in them in connection with national forest management plans, even though Service did not employ conservation biology in its final analysis; Service had appropriately considered conservation biology and ultimately determined that science to be uncertain in application, and Service did develop appropriate method of analyzing diversity. National Environmental Policy Act of 1969, § 102(2)(A, C), [42 U.S.C.A. § 4332\(2\)\(A, C\)](#); [40 C.F.R. § 1500.1](#).

[10] Environmental Law  **604(2)**

[149Ek604\(2\) Most Cited Cases](#)

(Formerly 199k25.10(6.4) Health and Environment)

Forest Service, in evaluating diversity in environmental impact statement (EIS) regarding management of national forests, is entitled to use its own methodology, unless it is irrational. National Environmental Policy Act of 1969, § 102(2)(A, C), [42 U.S.C.A. § 4332\(2\)\(A, C\)](#); [40 C.F.R. § 1500.1](#).

[11] Environmental Law  **689**

[149Ek689 Most Cited Cases](#)

(Formerly 199k25.15(10) Health and Environment)

Supreme Court's test for admissibility of scientific expert testimony would not be used as method of determining deference owed to Forest Service's scientific assertions under NEPA; forcing agency to make such showing as general rule would be intrusive and undeferential, and is not required. National Environmental Policy Act of 1969, § 102(2)(A, C), [42 U.S.C.A. § 4332\(2\)\(A, C\)](#); [40 C.F.R. § 1500.1\(c\)](#).

[12] Environmental Law  **689**

[149Ek689 Most Cited Cases](#)

(Formerly 199k25.15(10) Health and Environment)

Forest Service's method of measuring and maintaining diversity was entitled to deference, despite claim that "uncertainty" in application of conservation biology was inadequate justification for failure to apply conservation biology principles in environmental impact statements (EIS) and forest management plans; Service acknowledged developments in conservation biology, but did not think that they had been shown definitively applicable to forests such as Wisconsin forests at issue and, thus, circumstances did not warrant setting aside large portion of forests to study island biogeography and related theories at expense of other forest-plan objectives. Forest and Rangeland Renewable Resources Planning Act of 1974, § 6(g)(1), (g)(3)(B), as amended, [16 U.S.C.A. § 1604\(g\)\(1\), \(g\)\(3\)\(B\)](#); National Environmental Policy Act of 1969, § 102(2)(A, C), [42 U.S.C.A. § 4332\(2\)\(A, C\)](#); [36 C.F.R. §§ 219.3, 219.19, 219.26, 219.27\(a\)\(5\), \(g\)](#); [40 C.F.R. §§ 1500.1\(b\), 1502.6, 1502.14, 1502.22\(b\), 1502.24, 1508.8](#).

[13] Environmental Law ↪604(2)

[149Ek604\(2\) Most Cited Cases](#)

(Formerly 199k25.10(6.4) Health and Environment)

To extent that NEPA regulation mandated discussion of conservation biology by Forest Service in connection with development of forest management plan, Service more than adequately complied, despite claim that regulation obligated Service to conduct and disclose its own evaluation of effects of its management practices as predicted by conservation biology; Service specifically addressed possibility of creating large diversity maintenance areas (DMAs) to study island biogeography, but concluded that doing so in order to establish study area in one forest would likely cause reduction of services in following ten years and in long run, and as to other forest, Service concluded that there was insufficient justification to make study a priority for research at present time, but allowed for possibility that such research proposal could be presented at later date as site-specific proposal. National Environmental Policy Act of 1969, § 102(2)(A, C), [42 U.S.C.A. § 4332\(2\)\(A, C\)](#); [40 C.F.R. § 1502.22](#).

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Before CUMMINGS, FLAUM, and RIPPLE, Circuit Judges.

FLAUM, Circuit Judge.

Plaintiffs Sierra Club, Wisconsin Forest Conservation Task Force, and Wisconsin Audubon Council, Inc. (collectively, "Sierra Club") brought suit against defendant United States Forest Service ("Service") seeking to enjoin timber harvesting, road construction or reconstruction, and the creation of wildlife openings at two national forests in northern Wisconsin. The Sierra Club claimed that the Service violated a number of environmental statutes and regulations in developing forest management plans for the two national forests by failing to consider properly certain ecological principles of biological diversity. The district court determined that the plaintiffs' claims were justiciable but then granted the Service summary judgment on the merits of those claims. We affirm.

I.

The National Forest Management Act ("NFMA") requires the Secretary of Agriculture, who is responsible for the Forest Service, to develop "land and resource management plans" to guide the maintenance and use of resources within national forests. [16 U.S.C. §§ 1601-1604](#). In developing these plans the Secretary must determine the environmental impact these plans will have and discuss alternative plans,

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(Cite as: 46 F.3d 606)

pursuant to the National Environmental Policy Act ("NEPA"), *609 [42 U.S.C. § 4321](#) *et seq.* The Secretary must also consider the "multiple use and sustained yield of the several products and services obtained" from the forests, pursuant to the Multiple-Use Sustained Yield Act ("MUSYA"), [16 U.S.C. §§ 528-531](#).

The process for developing plans is quite elaborate. The Service must develop its management plans in conjunction with coordinated planning by a specially-designated interdisciplinary team, extensive public participation and comment, and related efforts of other federal agencies, state and local governments, and Indian tribes. [36 C.F.R. §§ 219.4-219.7](#). Directors at all levels of the Service participate in the planning process for a given national forest. The Forest Supervisor, who is responsible for one particular forest, initially appoints and then supervises the interdisciplinary team in order to help develop a plan and coordinate public participation. The Supervisor and team then develop a draft plan and draft environmental impact statement ("EIS"), which is presented to the public for comment. [36 C.F.R. §§ 219.10\(a\), 219.10\(b\)](#). After a period of comment and revision, a final plan and final EIS are sent to the Regional Forester, who directs one of four national forest regions, for review. If the Regional Forester approves them, she issues both along with a Record of Decision ("ROD") explaining her reasoning. [36 C.F.R. § 219.10\(c\)](#). An approved plan and final EIS may be appealed to the Forest Service Chief ("Chief") as a final administrative decision. [36 C.F.R. §§ 219.10\(d\)](#), 211.18.

The final plan is a large document, complete with glossary and appendices, dividing a forest into "management areas" and stipulating how resources in each of these areas will be administered. The plans are ordinarily to be revised on a ten-year cycle, or at least once every fifteen years. [36 C.F.R. § 219.10\(g\)](#).

The present case concerns management plans developed for two forests: Nicolet National Forest ("Nicolet") and Chequamegon (She-WA-me-gon) National Forest ("Chequamegon"). Nicolet spreads over 973,000 acres, of which 655,000 acres are National Forest Land, in northeastern Wisconsin, while Chequamegon encompasses 845,000 publicly-owned acres in northwestern and north-central

Wisconsin. [\[FN1\]](#) Collectively, the Nicolet and the Chequamegon contain hundreds of lakes and streams, thousands of miles of roads and trails, and serve a wide variety of uses, including hiking, skiing, snowmobiling, logging, fishing, hunting, sightseeing, and scientific research. The forests are important for both the tourism and the forest product industries in northern Wisconsin.

[\[FN1\]](#). Until the mid-1800s, both the Nicolet and Chequamegon were old-growth forests consisting primarily of northern hardwoods. Pine logging around 1900, hardwood logging in the 1920s, and forest fires (caused by clear cutting) significantly affected the landscape. Government replanting and forest-fire control efforts beginning in the 1930s have reclaimed much of the land as forest. The forests now contain a mixture of trees that markedly differs from the forests' pre-1800 "natural" conditions but is also more diverse in terms of tree type and age.

In the late 1970s and early 1980s, the Nicolet and Chequamegon Forest Supervisors and interdisciplinary teams each began drafting a forest management plan for their respective forests. These plans were expected to guide forest management for ten to fifteen years beginning in 1986. Drafts of the Nicolet plan and an EIS comparing the proposed plan to several alternatives were issued on November 9, 1984, while similar drafts of the Chequamegon plan were issued on March 29, 1985. Both plans were followed by a period of public comment, pursuant to [16 U.S.C. § 1604\(d\)](#), which resulted in a number of changes to both plans.

The Regional Forester issued final drafts of both plans on August 11, 1986, as well as final environmental impact statements ("FEIS") and RODs explaining the final planning decisions. Various citizens' groups, including the Sierra Club, challenged the plans in administrative appeals. Chief F. Dale Robertson affirmed in part and remanded in part the Nicolet plan on February 22, 1988, and affirmed in part and remanded in part the Chequamegon plan on January 31, 1990. [\[FN2\]](#)

[\[FN2\]](#). The Chief remanded the Nicolet plan for four

basic alterations. First, the Chief directed the Regional Forester to implement the proposal to establish a committee of experts to aid in enhancing diversity. Second, the Chief ordered the Regional Forester to include certain measures to aid recovery of the Wisconsin Timber Wolf. Third, the Chief instructed the Regional Forester to include appropriate measures for the preservation of certain sensitive plant species omitted in the existing plan and provide for monitoring of the effectiveness of the standards and guidelines for sensitive plants. Fourth, he requested the Regional Forester to update his analysis of population viability for those species used as indicators of management practices.

The Chief remanded the Chequamegon plan on grounds largely similar to the remand of the Nicolet plan. The only differences were that Chief gave no additional instructions regarding Timber Wolf recovery in the Chequamegon, but did direct the Regional Forester to reexamine the selection of certain species used as indicators of the effects of management practices on the forest in order to be sure they reflected the effects of those practices on forest vegetation.

***610** The Sierra Club brought an action against the Service in the district court on April 2, 1990, over the Nicolet plan and on October 10, 1990, over the Chequamegon plan. Suing under the Administrative Procedure Act ("APA"), [5 U.S.C. § 701-06](#), [\[FN3\]](#) the Sierra Club argued in both cases that the Service had acted arbitrarily or capriciously in developing these forest management plans and FEISs. The Sierra Club requested both declaratory and injunctive relief. The Service, in turn, replied that the Sierra Club lacked standing to challenge the forest plans or FEISs. Both sides moved for summary judgment.

[FN3](#). Neither the NFMA nor NEPA nor MUSYA explicitly provide for judicial review of Forest Service decisions. The Sierra Club therefore brought suit under the APA, which stipulates that "a person suffering a legal wrong because of agency action, or adversely affected or aggrieved by agency action

within the meaning of a relevant statute, is entitled to judicial review thereof." [5 U.S.C. § 702](#).

The Sierra Club's primary contention concerned the Service's failure to employ the science of conservation biology, which failure led it to violate a number of statutes and regulations regarding diversity in national forests. Conservation biology, the Sierra Club asserted, predicts that biological diversity can only be maintained if a given habitat is sufficiently large so that populations within that habitat will remain viable in the event of disturbances. Accordingly, dividing up large tracts of forest into a patchwork of different habitats, as the Nicolet and Chequamegon plans did, would not sustain the diversity within these patches unless each patch were sufficiently large so as to extend across an entire landscape or regional ecosystem. *See, generally*, Reed F. Noss, [Some Principles of Conservation Biology. As They Apply to Environmental Law](#), [69 Chi.-Kent L.Rev.](#) 893 (1994). Hence, the Sierra Club reasoned, the Service did not fulfil its mandates under the NFMA, NEPA and MUYSA to consider and promote biological diversity within the Nicolet and the Chequamegon.

On February 9, 1994, the district court denied the Sierra Club's motion for summary judgment and granted the Service's with regard to the Nicolet. The court held that the Sierra Club had standing to challenge the forest management plan without attacking any specific action under the plan and that the plan was ripe for judicial review. The court then found for the Service on the merits, holding that because of the uncertain nature of application of many theories of conservation biology, the Service had not erred in failing to apply it and so had not violated the NFMA, NEPA, or MUSYA. [Sierra Club v. Marita](#), [843 F.Supp.](#) 1526 (E.D.Wis.1994) ("*Nicolet* "). The court issued a similar opinion with regard to the Chequamegon plan on March 7, 1994. [Sierra Club v. Marita](#), [845 F.Supp.](#) 1317 (E.D.Wis.1994) ("*Chequamegon* "). This consolidated appeal of the two cases followed.

II.

At the threshold we must determine whether the Sierra Club has presented a justiciable claim. The Sierra Club has challenged forest management plans rather than specific Service actions that more directly affect a forest, and these broad

challenges raise questions of both standing and ripeness. Although the doctrines of standing and ripeness ostensibly require different inquiries, they "are closely related, and in cases like this one perhaps overlap entirely." *Smith v. Wisconsin Dept. of Agriculture*, 23 F.3d 1134, 1141 (7th Cir.1994); see also *611 *Warth v. Seldin*, 422 U.S. 490, 499 n. 10, 95 S.Ct. 2197, 2205 n. 10, 45 L.Ed.2d 343 (1975) ("The standing question thus bears close affinity to questions of ripeness--whether the harm asserted has matured sufficiently to warrant judicial intervention..."); Gene R. Nichol, Jr., *Ripeness and the Constitution*, 54 U.Chi.L.Rev. 153, 155, 172-73 (1987) (noting that "the ripeness requirement is often indistinguishable from actionability analysis" and that no "line of demarcation" can be drawn between the Supreme Court's analysis in standing cases where "threatened or actual injury" is at issue and ripeness cases where the focus is on "direct and immediate harm"). Nonetheless, we will address standing and ripeness separately, reviewing the district court's decision on both points *de novo*. See *Indemnified Capital Investments, S.A. v. R.J. O'Brien & Assoc., Inc.*, 12 F.3d 1406, 1409 (7th Cir.1993).

A.

[1] The constitutional minimum for Article III standing contains three elements: the actual or imminent invasion of a concrete and particularized legally-protected interest (an "injury in fact"), a causal connection between the defendant's actions and the injury, and a likelihood that the injury is redressable by a favorable court decision. *Lujan v. Defenders of Wildlife*, 504 U.S. 555, ----, 112 S.Ct. 2130, 2136, 119 L.Ed.2d 351 (1992). The Service does not dispute, and we agree, that the Sierra Club's interest in this case-- the use and enjoyment of the Chequamegon and Nicolet Forests--is concrete and legally cognizable, see *Sierra Club v. Morton*, 405 U.S. 727, 734, 92 S.Ct. 1361, 1366, 31 L.Ed.2d 636 (1972), and that the Sierra Club may maintain standing on behalf of its members. See *Hunt v. Washington Apple Advertising Commn.*, 432 U.S. 333, 343, 97 S.Ct. 2434, 2441, 53 L.Ed.2d 383 (1977). It is also uncontested that the Service's actions could harm the Sierra Club's interest and that this resulting injury is likely redressable through court action. See *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1517-18 (9th Cir.1992) (discussing causation and redressability in the context of a forest management plan).

[2] Rather, the Service questions the imminence of the Sierra Club's alleged injury. The Service notes that the forest management plans and FEISs are programmatic and do not themselves implement anything or specify that any particular activity happen; the plans are thought without action. In the absence of action, the Service argues, there is no imminent injury, and without an imminent or "certainly impending" injury, there is no standing. *Defenders*, 504 U.S. at ----, 112 S.Ct. at 2136; *Whitmore v. Arkansas*, 495 U.S. 149, 158, 110 S.Ct. 1717, 1724-25, 109 L.Ed.2d 135 (1990).

We disagree. As the district court pointed out, the regulations regarding forest management plans speak in mandatory terms. The plans

guide all natural resource management activities and establish management standards and guidelines for the National Forest System. They determine resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

36 C.F.R. § 219.1(b). All "permits, contracts, cooperative agreements, and other instruments for occupancy and use of affected lands" in a national forest must be consistent with the plan. 36 C.F.R. § 219.10(e); see also Record in 94-1827 (Nicolet), Pl.Ex. A at 5, Def.'s Resp. to Int. 11(d) (Service, in response to question about broad issues of diversity, admitted that all decisions relevant to those issues at the project level would be guided by the plan); Record in 94-1736 (Chequamegon), Pl.Ex. A at 6, Def.'s Resp. to Int. 11(d) (same). The plans clearly require certain projects to be undertaken and indicate what their effects may be. Cf. Charles F. Wilkinson and H. Michael Anderson, *Land and Resource Planning in the National Forests*, 64 Or.L.Rev. 1, 74 (1985) ("Much like zoning requirements or administrative regulations, the plans are controlling and judicially enforceable until properly revised."). That "the Service has yet to actually *inflict* the injury through the development of site-specific projects does not render the injury 'conjectural' or 'speculative' and therefore does not deprive plaintiffs of *612 standing to challenge the plan." *Nicolet*, 843 F.Supp. at 1531; *Chequamegon*, 845 F.Supp. at 1321; see also *Idaho Conservation League*, 956 F.2d at 1515-17. As the Supreme Court noted in the very sentence before it created the "certainly impending" language on which the defendants rely,

"[o]ne does not have to await the consummation of threatened injury to obtain preventive relief." [Pennsylvania v. West Virginia](#), 262 U.S. 553, 593, 43 S.Ct. 658, 663, 67 L.Ed. 1117 (1923).

With regard to NEPA and the FEISs, the Service's argument against standing is even weaker. The Supreme Court explicitly stated in *Lujan v. Defenders of Wildlife* that a plaintiff clearly has standing to sue where there is a concrete injury underlying the procedural default even if the plan were not implemented immediately. [Defenders](#), 504 U.S. at ---- & n. 7, 112 S.Ct. at 2142 & n. 7. As the Ninth Circuit noted under similar circumstances, "the 'asserted injury is that the environmental consequences might be overlooked,' as a result of deficiencies in the government's analysis under environmental statutes." [Seattle Audubon Soc'y. v. Espy](#), 998 F.2d 699, 703 (9th Cir.1993); see also [Idaho Conservation League](#), 956 F.2d at 1516; [Oregon Natural Resources Council v. Lowe](#), 836 F.Supp. 727, 732 (D.Or.1993); [Morris v. Myers](#), 845 F.Supp. 750, 754 (D.Or.1993). Once the plan has passed administrative review, the procedural injury has been inflicted. Unless a plaintiff's purported interest in the matter is wholly speculative, waiting any longer to address that injury makes little sense. Indeed, if the Sierra Club had to wait until the project level to address general procedural injuries regarding a broad issue like biological diversity, implementation of the forest plan might have progressed too far to permit proper redress. See [Rockford League of Women Voters v. United States Nuclear Regulatory Comm'n](#), 679 F.2d 1218, 1221 (7th Cir.1982) (holding that review of nuclear plant licensing procedures before issuance of license proper even though threatened injury to inhabitants had not yet materialized).

The Service argues that we should disregard the Ninth Circuit precedents cited above and rely instead on the Eighth Circuit's view of standing under the NFMA and NEPA as laid out in [Sierra Club v. Robertson](#), 28 F.3d 753 (8th Cir.1994) ("*Ouachita*"); see also [Wilderness Society v. Alcock](#), 867 F.Supp. 1026 (N.D.Ga.1994). In *Ouachita*, plaintiffs sued the Service for alleged violations of both NFMA and NEPA in drafting a forest management plan for the Ouachita National Forest. The court held that the plaintiffs lacked standing to challenge the plan "except in

the context of its application to a particular proposed timber sale." [Ouachita](#), 28 F.3d at 757. The *Ouachita* court reasoned that the plaintiffs had failed to meet the imminent injury requirement of *Defenders* because the forest management plan required no specific action. [Id.](#) at 758-59. Accordingly, plaintiffs could only suffer injury when the Service implemented some action (e.g., a timber sale) under the plan. "At that time, such persons may assert that the proposed site-specific action is not consistent with the Plan, or that the Plan as it relates to the proposed site-specific action is inconsistent with the governing statutes or both. Here, however, ... appellants mount their attack on the Plan per se, their arguments devoid of any reference to the particularities of any proposed site-specific action that might give rise to an injury in fact." [Id.](#) at 759; see also [Wilderness Society](#), 867 F.Supp. at 1040-41.

We disagree with the *Ouachita* analysis. Both the Service and the *Ouachita* court rely on the changes wrought by the Supreme Court in *Defenders*. Although *Defenders* may have altered the law of standing in important ways, especially with regard to redressability, see Cass R. Sunstein, *What's Standing After Lujan? Of Citizen Suits, "Injuries," and Article III*, 91 Mich.L.Rev. 163, 197-215 (1992) (discussing *Defenders* and its implications), temporal imminence is not one of those ways. In *Defenders*, the plaintiffs had alleged that they would suffer injury because construction projects in Sri Lanka and Egypt partially supported by United States' funds might threaten endangered species that the plaintiffs wanted to examine and study later. [Defenders](#), 504 U.S. at ---- - ----, 112 S.Ct. at 2137-38. The lack of standing in *Defenders* hinged on *613 the speculative nature of the plaintiffs' interests; they did not regularly visit these foreign places and had no immediate plans to return there. [FN4] The plaintiffs' interests were not in imminent danger because "the acts necessary to make the injury happen [to those interests] [were] at least partly within the plaintiffs ['] own control." In other words, the *Defenders* Court did not perceive the plaintiffs' interests themselves as necessarily materializing, a situation far from the present case where it is only a matter of time before the management plans are implemented and affect the Sierra Club's interests. *Defenders* has therefore not overruled *Idaho Conservation League*. See [Resources Ltd., Inc. v. Robertson](#), 35 F.3d 1300,

[1302-03 \(9th Cir.1994\)](#).

[FN4](#). A plurality of the Court also found that the plaintiffs had failed to establish redressability. [Defenders](#), 504 U.S. at ---- - ----, 112 S.Ct. at 2140-42. Redressability is not at issue in the present case.

The Sierra Club has also not brought a "citizen suit" against the Service. *Defenders* rejected the notion that Congress could empower citizens to vindicate a general public interest in having executive-branch officers comply with the law. *See Defenders*, 504 U.S. at ---- - ----, 112 S.Ct. at 2143-46; *see also* Sunstein, *supra*. The Sierra Club did not seek redress of a "generalized grievance," however, but of a grievance to its members' interests in using and enjoying the resources of the national forests of northern Wisconsin. To the extent that the Sierra Club suffered a procedural injury, it is directly tied to an underlying, particularized interest. Thus, contrary to the Service's assertions, *Defenders* poses no bar to the Sierra Club's suits.

[\[3\]\[4\]](#) Finally, we recognize that one of the fundamental rationales underlying constitutional standing requirements is not operating in this case. Standing requirements guarantee that courts do not decide abstract principles of law but rather concrete cases and controversies. Standing requirements "ensure that our deliberations will have the benefit of adversary presentation and a full development of the relevant facts." [Bender v. Williamsport Area School Dist.](#), 475 U.S. 534, 542, 106 S.Ct. 1326, 1331, 89 L.Ed.2d 501 (1986); *see also* [Simon v. Eastern Kentucky Welfare Rights Org.](#), 426 U.S. 26, 38, 96 S.Ct. 1917, 1924, 48 L.Ed.2d 450 (1976) (Standing requirements "tend to assure that legal questions presented to the court will be resolved, not in the rarified atmosphere of a debating society, but in a concrete factual context conducive to a realistic appreciation of the consequences of judicial action."). In the present case, the Sierra Club argues that the plans as a whole inadequately address biological diversity and that procedural defaults in the development of those plans may have led to that inadequacy. Waiting until an actual timber sale occurs under the plan will not clarify the presentation of issues; arguments over the plans' sufficiency as a whole or the procedures followed in developing the plans with regard to diversity are as

concrete now as they will ever become. [\[FN5\]](#) We thus hold that the Sierra Club had standing to sue.

[FN5](#). The Sierra Club could also have challenged the sufficiency of the plans in the course of challenging a site-specific action undertaken pursuant to the plans, a point conceded by the Service at oral argument. The Sierra Club maintained in its brief that our opinion in [Cronin v. U.S. Dept. of Agriculture](#), 919 F.2d 439 (7th Cir.1990), foreclosed this option. Contrary to the Sierra Club's assertions, *Cronin* poses no such bar. In *Cronin* we held only that the Service need not ordinarily conduct a new environmental impact study each time it authorized a site-specific action under a forest management plan. *Cronin* does not limit the review of a site-specific action to its conformity with a forest management plan; the sufficiency of the plan itself may also be challenged at that later time, if appropriate. The case that does suggest that a forest plan's adequacy may not be considered at the site-specific level is, ironically, *Idaho Conservation League*, in which the Ninth Circuit noted that "if the agency action only could be challenged at the site-specific development stage, the underlying programmatic authorization would forever escape review." [956 F.2d at 1516](#); *see also* [Krichbaum v. Kelley](#), 844 F.Supp. 1107, 1116 (W.D.Va.1994) (holding that general issues of forest fragmentation and edge effects were more appropriately addressed at the planning stage rather than in a preliminary injunction to stop a timber sale on a 114-acre plot). While *Idaho Conservation League* and *Krichbaum* may have been correct on their specific facts, we decline to adopt this position as a general rule. Moreover, the Ninth Circuit itself seems to have reconsidered these limitations in [Smith v. U.S. Forest Service](#), 33 F.3d 1072, 1075 (9th Cir.1994) (holding that "a failure to challenge factual determinations made in the Forest Plan EIS does not prevent [an individual] from challenging the sufficiency of the agency's NEPA disclosure at the implementation stage" because of a failure to exhaust administrative remedies).

*614 B.

[5] The Service has also contended that the Sierra Club's claim is not ripe. The "basic rationale" of the ripeness doctrine "is to prevent the courts, through avoidance of premature adjudication, from entangling themselves in abstract disagreements over administrative policies" and "to protect the agencies from judicial interference until an administrative decision has been formalized and its effects felt in a concrete way by the challenging parties." *Abbott Laboratories v. Gardner*, 387 U.S. 136, 148-49, 87 S.Ct. 1507, 1515, 18 L.Ed.2d 681 (1967); see also Nichol, *supra* at 161. Thus, the argument that the Sierra Club's claim is not ripe is similar to the standing argument: "No concrete action affecting appellants' rights has yet been taken; only when the more site-specific actions occur will the case have sufficiently ripened." *Idaho Conservation League*, 956 F.2d at 1518; see also *Lujan v. National Wildlife Federation*, 497 U.S. 871, 891, 110 S.Ct. 3177, 3190, 111 L.Ed.2d 695 (1990) ("NWF") (holding an agency program for applying a statute not ripe for review).

The ripeness argument fails for much the same reason the standing argument fails. The Sierra Club is appealing the issuance of a final management plan which will, unless amended, direct Service management activities in Nicolet and Chequamegon. Unlike the Department of the Interior in *NWF*, the Service has here issued a final plan that is appealable. See 36 C.F.R. § 219.10(d). The Sierra Club "need not wait to challenge a specific project when their grievance is with an overall plan." *Resources Ltd.*, 35 F.3d at 1304 (9th Cir.1993) (quoting *Seattle Audubon*, 998 F.2d at 703); see also *Portland Audubon Soc'y. v. Babbit*, 998 F.2d 705, 708 (9th Cir.1993) (Moreover, the decision is ripe for review now rather than when individual sales are announced because, to the extent these T[imber]M [anagement]P[ans] pre-determine the future, the Secretary's failure to comply with NEPA represents a concrete injury which would undermine any future challenges by plaintiffs.); *Idaho Conservation League*, 956 F.2d at 1519.

Having determined that the Sierra Club's claims are presently justiciable, we now address the merits of these claims.

III.

The Sierra Club claims that the Service violated the NFMA and NEPA by using scientifically unsupported techniques to address diversity concerns in its management plans and by arbitrarily disregarding certain principles of conservation biology in developing those plans. The Sierra Club asserts that the Service abdicated its duty to take a "hard look" at the environmental impact of its decisions on biological diversity in the forests on the erroneous contentions that the Sierra Club's proposed theories and predictions were "uncertain" in application and that the Service's own methodology was more than adequate to meet all statutory requirements. According to the Sierra Club, the Service, rather than address the important ecological issues the plaintiffs raised, stuck its head in the sand. The result, the Sierra Club argues, was a plan with "predictions about diversity directly at odds with the prevailing scientific literature."

A.

Several statutes and regulations mandate consideration of diversity in preparing forest management plans. Section 6(g) of the NFMA, the primary statute at issue, directs the Secretary of Agriculture in preparing a forest management plan to, among other things,

provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan[.]

16 U.S.C. § 1604(g)(3)(B).

A number of regulations guide the application of this statute. The most general one stipulates that:

*615 Forest planning shall provide for diversity of plant and animal communities and tree species consistent with the overall multiple-use objectives of the planning area. Such diversity shall be considered throughout the planning process. Inventories shall include quantitative data making possible the evaluation of diversity in terms of its prior and present condition. For each planning alternative, the interdisciplinary team shall consider how diversity will be affected by various mixes of resource outputs and

uses, including proposed management practices.

[36 C.F.R. § 219.26](#). Another regulation addresses the substantive goals of the plan:

Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species, so that it is at least as great as that which would be expected in a natural forest and the diversity of tree species similar to that existing in the planning area. Reductions in diversity of plant and animal communities and tree species from that which would be expected in a natural forest, or from that similar to the existing diversity in the planning area, may be prescribed only where needed to meet overall multiple-use objectives....

[36 C.F.R. § 219.27\(g\)](#); see also [36 C.F.R. § 219.27\(a\)\(5\)](#) (requiring that all management prescriptions "provide for and maintain diversity of plant and animal communities to meet overall multiple-use objectives"). Diversity is defined for the purposes of these regulations as "[t]he distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan." [36 C.F.R. § 219.3](#).

Regulations implementing the NFMA with regard to the management of fish and wildlife resources are more specific still. First,

[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.... In order to ensure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

[36 C.F.R. § 219.19](#). In order to perceive the effects of management on these species, the Service must monitor the populations of specially selected "management indicator species" ("MIS"). [36 C.F.R. § 219.19\(a\)\(1\)](#). The selection of MIS must include, where appropriate, "endangered and threatened plant and animal species" identified on state and federal lists for the area; species with "special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished or

trapped, non-game species of special interest; and additional ... species selected because their population changes are believed to indicate the effects of management activities on other species ... or on water quality." *Id.*

The NFMA diversity statute does not provide much guidance as to its execution; "it is difficult to discern any concrete legal standards on the face of the provision." Wilkinson and Anderson, *supra* at 296. However, "when the section is read in light of the historical context and overall purposes of the NFMA, as well as the legislative history of the section, it is evident that section 6(g)(3)(B) requires Forest Service planners to treat the wildlife resource as a controlling, co-equal factor in forest management and, in particular, as a substantive limitation on timber production." *Id.*

In addition to the NFMA statute and regulations that specifically address diversity, NEPA also applies to the issue at hand. [FN6] See [16 U.S.C. § 1604\(g\)\(1\)](#) (requiring that forest plans be developed in accordance with NEPA and its EIS provisions). Section 102(2)(C) of NEPA requires that when the Service, as a federal agency, undertakes a *616 "major federal action," it must prepare an EIS containing a detailed statement of

[FN6] The district court considered the implications of MUSYA for diversity and determined that MUSYA added nothing to the NFMA requirements. See [Nicolet, 843 F.Supp. at 1540](#); [Chequamegon, 845 F.Supp. at 1328](#). The Sierra Club does not challenge that holding in this appeal.

the environmental impact of the proposed action, ... any adverse effects which cannot be avoided should the program be implemented, ... alternatives to the proposed action, ... the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and ... any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

[42 U.S.C. § 4332\(2\)\(C\)](#). Additionally, the Service is required to "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences...." [42 U.S.C. § 4332\(2\)\(A\)](#). In the language of the case law, NEPA thus broadly requires that the Service take a

"hard look" at the environmental consequences of its actions. [Robertson v. Methow Valley Citizens Council](#), 490 U.S. 332, 350, 109 S.Ct. 1835, 1846, 104 L.Ed.2d 351 (1989).

Several regulations under NEPA addressing the implementation of EISs also bear on the present case. First, the regulations require a "rigorous analysis" of alternatives to the proposed plan, including a "substantial treatment" of these alternatives in comparison to the proposed plan. [40 C.F.R. § 1502.14 \(1993\)](#). Second, the regulations require an agency undertaking an EIS to "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." [40 C.F.R. § 1502.24 \(1993\)](#). Additionally, the regulations require that the analysis be undertaken with an "interdisciplinary approach" to "insure the integrated use of the natural and social sciences and the environmental design arts." [40 C.F.R. § 1502.6 \(1993\)](#). NEPA also requires consideration in an EIS of the "ecological" effects of a proposed action. [40 C.F.R. § 1508.8 \(1993\)](#). Ecological effects include "the effects on natural resources and on the components, structures, and functioning of affected ecosystems." *Id.* Finally, as a matter of general policy, NEPA is designed to ensure "that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." [40 C.F.R. § 1500.1\(b\)](#).

The regulations also specify what an agency should do in an EIS in the face of "incomplete or unavailable information." The regulation states in relevant part that where such information is not known, the EIS must include:

- (1) A statement that such information is incomplete or unavailable;
- (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
- (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and
- (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community....

[40 C.F.R. § 1502.22\(b\) \(1993\)](#). [FN7]

[FN7] The present regulations were revised in April 1986, while the Service was preparing FEISs for Nicolet and Chequamegon. [51 Fed.Reg. 15618 \(1986\)](#). With respect to EISs in progress, such as the ones in the present case, the regulations permitted agencies to comply with either the original or the amended regulation. [40 C.F.R. § 1502.22\(c\) \(1993\)](#). The primary amendment was the removal of the requirement that agencies include a "worst case analysis" if there is "information relevant to adverse impacts [] essential to a reasoned choice and is not known and the overall costs of obtaining it are exorbitant or ... the means to obtain it are not known...." [51 Fed.Reg. at 15619](#); see also [Forty Most Asked Questions Concerning CEO's National Environmental Policy Act Regulations](#), [46 Fed.Reg. 18026, 18032 \(1981\)](#) (discussing when a "worst case scenario" must be included in an EIS). Given that the requirements of the present regulation are less stringent and that the Sierra Club has not asserted reliance on the earlier statute, we will assume that the revisions apply. See also [Methow Valley](#), 490 U.S. at 354-55, 109 S.Ct. at 1848 (noting that NEPA itself does not mandate a "worst case analysis" in the face of scientific uncertainty).

B.

The Service addressed diversity concerns in the Nicolet and Chequamegon in largely *617 similar ways, both of which are extensively detailed in the district court opinions issued below. See [Nicolet](#), 843 F.Supp. at 1533-40; [Chequamegon](#), 845 F.Supp. at 1322-28. The Service defined diversity as "[t]he distribution and abundance of different plant and animal communities and species within the area covered by the Land and Resource Management Plan." The Service assumed that "an increase in the diversity of habitats increases the potential livelihood of diverse kinds of organisms."

The Service focused its attention first on vegetative diversity. Diversity of vegetation was measured within tree stands as well as throughout the forest, noting that such diversity is "desirable for diverse wildlife habitat, visual variety, and as an aid to protecting the area from wildfire, in-

sects, and disease." The Service assessed vegetative diversity based on vegetative types, age class structure of timber types, within-stand diversity of tree species, and the spatial distribution pattern of all these elements across the particular forest. The Service also factored in other considerations, including the desirability of "large areas of low human disturbance" and amount of "old-growth" forest, into its evaluations. Using these guidelines, the Service gathered and analyzed data on the current and historical composition of the forests to project an optimal vegetative diversity.

The Service assessed animal diversity primarily on the basis of vegetative diversity. Pursuant to the regulations, the Service identified all rare and uncommon vertebrate wildlife species as well as those species identified with a particular habitat and subject to significant change through planning alternatives. The Service grouped these species with a particular habitat type, identifying 14 categories in the Nicolet and 25 (reduced to 10 similar types) in the Chequamegon. For each of these habitat types, the Service selected MIS (33 in the Nicolet and 18 in the Chequamegon) to determine the impact of management practices on these species in particular and, by proxy, on other species in general. [FN8] For each MIS, the Service calculated the minimum viable population necessary in order to ensure the continued reproductive vitality of the species. Factors involved in this calculation included a determination of population size, the spatial distribution across the forest needed to ensure fitness and resilience, and the kinds, amounts and pattern of habitats needed to support the population.

[FN8]. A number of the MIS selected were also chosen because their endangered status required the Service to monitor them directly.

Taking its diversity analysis into consideration, along with the its numerous other mandates, the Service developed a number of plan alternatives for each of the forests (eight in the Nicolet and nine in the Chequamegon). Each alternative emphasized a different aspect of forest management, including cost efficiency, wildlife habitat, recreation, and hunting, although all were considered to be "environmentally, technically, and legally feasible." In the Nicolet, the Service selected the alternative emphasizing resource outputs associated with large diameter hardwood and softwood vegeta-

tion; in the Chequamegon an alternative emphasizing recreational opportunities, quality saw-timber, and aspen management was chosen.

C.

The Sierra Club argues that the diversity statute and regulations, as well as NEPA, required the Service to consider and apply certain principles of conservation biology in developing the forest plan. These principles, the Sierra Club asserts, dictate that diversity is not comprehensible solely through analysis of the numbers of plants and animals and the variety of species in a given area. Rather, diversity also requires an understanding of the relationships between differing landscape patterns and among various habitats. That understanding, the Sierra Club says, has led to the prediction that the size of a habitat--the "patch size"--tends to affect directly the survival of the habitat and the diversity of plant and animal species within that habitat.

A basic generalization of conservation biology is that smaller patches of habitat will not support life as well as one larger patch of *618 that habitat, even if the total area of the smaller patches equals the total area of the large patch. This generalization derives from a number of observations and predictions. First, whereas a large-scale disturbance will wipe out many populations in a smaller patch, those in a larger patch have a better chance of survival. Second, smaller patches are subject to destruction through "edge effects." Edge effects occur when one habitat's environment suffers because it is surrounded by different type of habitat. Given basic geometry, among other factors, the smaller the patch size of the surrounded habitat, the greater the chance that a surrounding habitat will invade and devastate the surrounded habitat. Third, the more isolated similar habitats are from one another, the less chance organisms can migrate from one habitat to another in the event of a local disturbance. Consequently, fewer organisms will survive such a disturbance and diversity will decline. This third factor is known as the theory of "island biogeography." Thus, the mere fact that a given area contains diverse habitats does not ensure diversity at all; a "fragmented forest" is a recipe for ecological trouble. On the basis of these submissions, the Sierra Club desires us to rule that

[t]o perform a legally adequate hard look at the environ-

mental consequences of landscape manipulation across the hundreds of thousands of hectares of a National Forest, a federal agency must apply in some reasonable fashion the ecological principles identified by well accepted conservation biology. Species-by-species techniques are simply no longer enough. Ecology must be applied in the analysis, and it will be used as a criterion for the substantive results.

Nicolet Appellant's Br. at 7; Chequamegon Appellant's Br. at 7; *see generally* Nicolet Appellant's App. 273-336; Chequamegon Appellant's App. 223- 280 (describing principles of conservation biology).

As a way of putting conservation biology into practice, the Sierra Club suggested that large blocks of land (at least 30,000 to 50,000 acres per block), so-called "Diversity Maintenance Areas" ("DMAs"), be set aside in each of the forests. The Sierra Club proposed and mapped three DMAs for the Nicolet and two for the Chequamegon. In these areas, which would have included about 25% of each forest, habitats were to be undisturbed by new roads, timber sales, or wildlife openings. Neither forest plan, however, ultimately contained a DMA; the Chequamegon Forest Supervisor initially did include two DMAs, but the Regional Forester removed them from the final Chequamegon plan.

The Sierra Club contends that the Service ignored its submissions, noting that the FEISs and RODs for both the Nicolet and the Chequamegon are devoid of reference to population dynamics, species turnover, patch size, recolonization problems, fragmentation problems, edge effects, and island biogeography. According to the Sierra Club, the Service simply disregarded extensive documentary and expert testimony, including over 100 articles and 13 affidavits, supporting the Sierra Club's assertions and thereby shirked its legal duties. [\[FN9\]](#)

[\[FN9\]](#). The Service noted in its briefs that much of the Sierra Club's submissions regarding conservation biology, including the list of articles and the affidavits, was received after the close of the period for public comment. Such circumstances might seem to imply that the Service was at liberty to summarily dispose of the Sierra Club's evidence. The Service, however, did examine the information

and does not ever explicitly contend that this tardiness should now permit the Service to ignore the Sierra Club completely. We therefore assume the Service has waived any such argument and do not consider its merits.

The Service replies that it correctly considered the implications of conservation biology for both the Nicolet and Chequamegon and appropriately declined to apply the science. The Service asserts that it duly noted the "concern [of the Sierra Club and others] that fragmentation of the ... forest canopy through timber harvesting and road building is detrimental to certain plant and animal species." The Service decided that the theory had "not been applied to forest management in the Lake States" and that the subject was worthy of further study. However, the Service found in both cases that while the theories of conservation biology in general *619 and of island biogeography in particular were "of interest, ... there is not sufficient justification at this time to make research of the theory a Forest Service priority." Given its otherwise extensive analysis of diversity, as well as the deference owed its interpretation of applicable statutory and regulatory requirements, the Service contends that it clearly met all the "diversity" obligations imposed on it.

IV.

The case now turns to whether the Service was required to apply conservation biology in its analysis and whether the Service otherwise complied with its statutory mandates and regulatory prescriptions regarding diversity in national forests. We hold that the Service met all legal requirements in addressing the concerns the Sierra Club raises.

A.

[\[6\]](#) We note at the outset that the Sierra Club faces a high standard in challenging the Service's planning decisions. The APA, under which the Sierra Club has brought this suit, requires a court to set aside an agency action determined to be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law," or "without observance of procedure required by law." [5 U.S.C. §§ 706\(2\)\(A\), 706\(2\)\(D\)](#). In so doing, "the court must consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment." [Citizens to Preserve Overton Park, Inc. v. Volpe](#), 401 U.S. 402,

[416](#), [91 S.Ct. 814](#), [823-24](#), [28 L.Ed.2d 136](#) (1971). "Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency." *Id.* The party challenging the agency action also bears the burden of proof in these cases. See [Mississippi Hosp. Ass'n, Inc. v. Heckler](#), [701 F.2d 511](#), [516](#) (7th Cir.1983); see also Nossner, *supra* at 896 ("In practice, if not in intent, the burden of proof in the E[ndangered]S[pecies]A[ct] and NEPA is already on those who wish to protect the species or the environment.").

Despite these obstacles to the Sierra Club's claim, deference does not mean obeisance. Deference will not "shield [an agency] action from a thorough, probing, in-depth review." [Citizens to Preserve Overton Park](#), [401 U.S. at 415](#), [91 S.Ct. at 823](#); see also [City of West Chicago, Ill. v. United States Nuclear Regulatory Comm'n](#), [701 F.2d 632](#), [648](#) (7th Cir.1983). Where an "agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise," the agency has violated the standards of the APA. [Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.](#), [463 U.S. 29](#), [43](#), [103 S.Ct. 2856](#), [2867](#), [77 L.Ed.2d 443](#) (1983).

B.

[7] The Sierra Club's arguments regarding the inadequacy of the Service's plans and FEISs can be distilled into five basic allegations, each of which we address in turn. First, the Sierra Club asserts that the law "treats ecosystems and ecological relationships as a separately cognizable issue from the species by species concepts driving game and timber issues." The Sierra Club relies on the NFMA's diversity language to argue that the NFMA treats diversity in two distinct respects: diversity of plant and animal communities and diversity of tree species. See [16 U.S.C. § 1604\(g\)\(3\)\(B\)](#). The Sierra Club also points to NEPA's stipulations that environmental policy should focus on the "interrelations of all components of the natural environment," [42 U.S.C. § 4331](#), and regulations which require an EIS to include an analysis

of "ecological" effects. See [40 C.F.R. § 1508.8](#). The Sierra Club concludes from these statutes and regulations that the Service was obligated to apply an ecological approach to forest management and failed to do so. In the Sierra Club's view, MISs and population viability analyses present only half the picture, a picture that the addition of conservation biology would make complete.

*620 The Sierra Club errs in these assertions because it sees requirements in the NFMA and NEPA that simply do not exist. The drafters of the NFMA diversity regulations themselves recognized that diversity was a complex term and declined to adopt any particular means or methodology of providing for diversity. Report of the Committee of Scientists to the Secretary of Agriculture Regarding Regulations Proposed by the United States Forest Service to Implement Section 6 of the National Forest Management Act of 1976, [44 Fed.Reg. 26,599](#), [26,609](#) (1979). We agree with the district court that "[i]n view of the committee's decision not to prescribe a particular methodology and its failure to mention the principles that plaintiffs claim were by then well established, the court cannot fairly read those principles into the NFMA...." [Nicolet](#), [843 F.Supp. at 1542](#); [Chequamegon](#), [845 F.Supp. at 1330](#). Thus, conservation biology is not a necessary element of diversity analysis insofar as the regulations do not dictate that the service analyze diversity in any specific way.

Furthermore, the Sierra Club has overstated its case by claiming that MIS and population viability analyses do not gauge the diversity of ecological communities as required by the regulations. Except for those species to be monitored because they themselves are in danger, species are chosen to be on an MIS list precisely because they will indicate the effects management practices are having on a broader ecological community. Indeed, even if all that the Sierra Club has asserted about forest fragmentation and patch size and edge effects is true, an MIS should to some degree indicate their impact on diversity. See Report of the Committee of Scientists, [44 Fed.Reg. at 26,627](#) (noting that MIS are chosen "because they indicate the consequences of management on other species whose populations fluctuate in some measurable manner with the indicator species"); Judy L. Meyer, [The Dance of Nature: New Concepts in Ecology](#), [69](#)

[Chi.-Kent L.Rev. 875](#), 885 (1994) (noting that the most sensitive indicator of environmental stress is the population level). While the NFMA would not permit the Service to limit its choices to either enhancing diversity or protecting a particular species, see [Seattle Audubon Society v. Evans](#), [952 F.2d 297, 301-02 \(9th Cir.1991\)](#), such is not the case here. The Sierra Club may have wished the Service to analyze diversity in a different way, [\[FN10\]](#) but we cannot conclude on the basis of the records before us that the Service's methodology arbitrarily or capriciously neglected the diversity of ecological communities in the two forests.

[FN10](#). The Service acknowledged at oral argument that conservation biology was the "new trend in science," indicating that the Service may well change its mind when evaluating future forest plans.

[\[8\]](#) In a second and related argument, the Sierra Club submits that the substantive law of diversity necessitated the set-aside of large, unfragmented habitats to protect at least some old-growth forest communities. The Sierra Club points out that [36 C.F.R. § 219.27\(g\)](#) requires that "where appropriate and to the extent practicable" the Service "shall preserve and enhance the diversity of plant and animal communities ... so that it is at least as great as that which would be expected in a natural forest...." Furthermore, "[r]eductions in diversity of plant and animal communities and tree species from that which would be expected in a natural forest or from that similar to the existing diversity in the planning area[] may be prescribed only where needed to meet overall multiple-use objectives." *Id.* Diversity, the Sierra Club asserts, requires the Service to maintain a range of different, ecologically viable communities. Because it is simply not possible to ensure the survival of any old-growth forest communities without these large, undisturbed patches of land, the Service has therefore reduced diversity. The Service was thus bound to protect and enhance the natural forest or explain why other forest uses prevented the Service from doing so. The Sierra Club believes the Service did neither.

The Sierra Club asserts that the diversity regulations require a certain procedure and that because the substantive result of the Service's choices will produce, in the Sierra Club's view,

results adverse to "natural forest" diversity, the Service has violated its mandate. However, as the Service points out, the regulations do not actually require the promotion of "natural forest" diversity but rather the promotion of diversity at least as great as that found in a natural forest. The Service maintains that it did provide for such diversity in the ways discussed above. Additionally, the Service did consider the maintenance of some old-growth forest, even though the Sierra Club disputes that the Service's efforts will have any positive effects. And to the extent the Service's final choice did not promote "natural diversity" above all else, the Service acted well within its regulatory discretion. See [Sierra Club v. Espy](#), [38 F.3d 792, 800 \(5th Cir.1994\)](#) ("That [NFMA diversity] protection means something less than the preservation of the status quo but something more than eradication of species suggests that this is just the type of policy-oriented decision Congress wisely left to the discretion of the experts--here, the Forest Service."); cf. [Methow Valley](#), [490 U.S. at 350, 109 S.Ct. at 1846](#) ("If the adverse environmental effects of the proposed action are adequately identified and evaluated, the agency is not constrained by NEPA from deciding that other values outweigh the environmental costs.").

[\[9\]](#) Third, the Sierra Club asserts that the Service failed in its responsibility under NEPA to utilize "high quality" science in preparing EISs and evaluating diversity in them. [40 C.F.R. § 1500.1](#). The Sierra Club believes that it more than adequately demonstrated that conservation biology is (and was at the time the Service prepared its FEISs) an essential element of any proper scientific evaluation of diversity in the Nicolet and Chequamegon. The Sierra Club also points to a mountain of literature, as well as thirteen experts, that demonstrate its point. Indeed, the district court itself "safely assume[d] that the principles of conservation biology set forth by the plaintiffs represent sound ecological theory." [Nicolet](#), [843 F.Supp. at 1541](#); [Chequamegon](#), [845 F.Supp. at 1329](#). The Sierra Club notes that the Service not only failed to apply these prevailing scientific views but drew conclusions directly at odds with them, especially in assuming that certain management activities, including cutting and creating wildlife openings, would help rather than hinder diversity. Consequently, the Service deserves no deference.

[10] Again, we disagree. The Service is entitled to use its own methodology, unless it is irrational. See [California v. Watt](#), 712 F.2d 584, 597 (D.C.Cir.1983); [Sierra Club v. Robertson](#), 810 F.Supp. 1021, 1028 (W.D.Ark.1992), *aff'd in relevant part, vacated in part*, 28 F.3d 753 (8th Cir.1994). The Service, as discussed at length in Section III, developed an appropriate method of analyzing diversity. The Sierra Club is correct that the Service did not employ conservation biology in its final analysis. However, the Service appropriately considered conservation biology and ultimately determined that science to be uncertain in application. [FN11] With regard to the Service's assumption that human intervention in the form of cuttings could aid diversity, the Service notes that it was precisely its intervention in the past fifty years that permitted the forests to rejuvenate after the logging and fires prior to the 1930s. Moreover, the Service proposes, without some intervention, the forests would return to their pre-1800s, climax hardwood composition, a composition less diverse than at present. We cannot conclude from the record and these explanations that the Service acted irrationally.

[FN11] We thus do not have before us a case in which the Service "did not contain a significant discussion" of an environmental impact and thereby failed to take a "hard look" at an issue. [Marble Mountain Audubon Soc'y. v. Rice](#), 914 F.2d 179, 182 (9th Cir.1990) (Service entirely ignored question of maintaining a biological corridor between two wilderness areas in drafting an EIS.).

[11] In supporting the Sierra Club's allegation that the Service used "bad" science, amici Society for Conservation Biology and the American Institute of Biological Sciences have suggested that we borrow the Supreme Court's test for admissibility of scientific expert testimony as set forth in *622 [Daubert v. Merrell Dow Pharmaceuticals, Inc.](#), 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), [FN12] as a way of determining whether the Service's scientific assertions are owed any deference under NEPA. We decline the suggestion. While such a proposal might assure better documentation of an agency's scientific decisions, we think that forcing an agency to make such a showing as a general rule is intrusive, undeferential, and not required. An EIS is

designed to ensure open and honest debate of the environmental consequences of an agency action, not to prove admissibility of testimony in a court of law. Cf. 40 C.F.R. § 1500.1(c) ("Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork--even excellent paperwork--but to foster excellent action.").

[FN12] *Daubert* requires district courts to consider a number of factors in determining the admissibility of expert testimony regarding a scientific theory under F.R.E. 702, including (but not limited to) whether the theory can be or has been tested, whether the theory has been subjected to peer review and publication, the known or potential rate of error in applications of the theory, and the "general acceptance of the theory in the relevant scientific community." 509 U.S. 579 - ----, 113 S.Ct. at 2796-97; [Bradley v. Brown](#), 42 F.3d 434 (7th Cir.1994).

[12] Fourth, the Sierra Club contends that the rejection of its "high quality" science argument on the basis of "uncertainty" in the application of conservation biology was unscrupulous. The Sierra Club asserts that conservation biology represented well-accepted and well-respected science even at the time the Service developed its management plans in the mid-1980s and that this evidence was before the Service when it drafted the forest plans. Thus, if the Service's only argument against applying the "high quality" science of conservation biology was its uncertainty, the Service has utterly failed to respond to the challenge of conservation biology.

A brief look at available evidence suggests that the district court's understanding of uncertainty was correct and the Service's explanation principled. The Service, in looking at island biogeography, noted that it had been developed as a result of research on actual islands or in the predominantly old-growth forests of the Pacific Northwest and therefore did not necessarily lend itself to application in the forests of Wisconsin. Literature submitted by the Sierra Club to the Service was not unequivocal in stipulating how to apply conservation biology principles in the Nicolet and Chequamegon. Likewise, a Sierra Club group member sug-

gested during meetings regarding the Chequamegon that "the Forest Service should be a leader and incorporate this concept into the Plan. He indicated that it would set a precedent for other Forests and Regions." Pl.Brief App. I at 95. The Chequamegon Forest Supervisor also originally decided to include the DMAs in his forest plan not because science so compelled but as a way to research an as yet untested theory. Even recent literature has recognized that "new legislation may be necessary" in order to force the Service to adopt conservation biology. Robert B. Keiter, *Conservation Biology and the Law: Assessing the Challenges Ahead*, 69 *Chi.Kent L.Rev.* 911, 916 (1994). Perhaps the Service "ha[s] the ability to reinterpret [its] own governing mandates to give species protection priority over visitor services and other concerns," *id.* at 921, but that is not and was not required.

The amici scientific societies suggest that the district court misunderstood the nature of scientific uncertainty. Their argument on this point boils down to the assertion that all scientific propositions are inherently unverifiable and at most falsifiable. See *Daubert*, 509 U.S. at ---, 113 S.Ct. at 2795 (1993) ("[I]t would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguable there are no certainties in science."); Richard A. Posner, *THE PROBLEMS OF JURISPRUDENCE* 367 (Harvard 1990) ("[B]ecause of the possibility of ever really 'confirming' a scientific hypothesis it might be best to view all scientific knowledge as conjectural."). Hence, amici argue, allowing the Service to ignore the theories of conservation biology because they are "uncertain" would, on the same logic, allow the Service to ignore the theory of gravity.

Amici, like the Sierra Club, misapprehend the "uncertainty" of which the Service and the district court spoke. We agree that an *623 agency decision to avoid a science should not escape review merely because a theory is not certain. But, however valid a general theory may be, it does not translate into a management tool unless one can apply it to a concrete situation. The Service acknowledged the developments in conservation biology but did not think that they had been shown definitively applicable to forests like the Nicolet or the Chequamegon. Thus, circumstances did not warrant setting aside a large portion of these forests to study island

biogeography and related theories at the expense of other forest-plan objectives. Given that uncertainty, we appropriately defer to the agency's method of measuring and maintaining diversity. See *Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc.*, 462 U.S. 87, 103, 103 S.Ct. 2246, 2255, 76 L.Ed.2d 437 (1983).

[13] Fifth and finally, the Sierra Club argues that even if the application of conservation biology was uncertain, the district court overlooked the dispositive NEPA regulation regarding scientific uncertainty, 40 C.F.R. § 1502.22. The Sierra Club asserts that with regard to conservation biology, this regulation required the Service to "[state] of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment, ... summar[ize] existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and ... evaluat[e] such impacts based upon theoretical approaches or research methods generally accepted in the scientific community." 40 C.F.R. § 1502.22(b). The Sierra Club contends that once the Service determined that the application of conservation biology was uncertain, § 1502.22 obligated the agency to conduct and disclose its own evaluation of the effects of its management practices as predicted by conservation biology.

Regardless of whether the district court erred in ignoring § 1502.22, the record clearly shows that the Service sufficiently complied with this regulation. The Service looked at and disclosed the foreseeable environmental effects of the proposed alternatives and discussed them at length. The fact that it did not adopt them is inconsequential, for "it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process." *Methow Valley*, 490 U.S. at 350, 109 S.Ct. at 1846 (citations omitted). Nor did § 1502.22 require the Service to use a methodology it reasonably found lacking in certainty of application. "NEPA does not require that we decide whether an [EIS] is based on the best scientific methodology available, nor does NEPA require us to resolve disagreements among various scientists as to methodology." *Friends of Endangered Species, Inc. v. Jantzen*, 760 F.2d 976, 986 (9th Cir.1985); see also *Salmon River Concerned Citizens v.*

[Robertson, 32 F.3d 1346, 1359 \(9th Cir.1994\)](#) (noting that a court's task "is to ensure that the Forest Service's procedures resulted in a reasoned analysis and disclosure of the evidence before it").

To the extent [§ 1502.22](#) did mandate a discussion of conservation biology, the Service more than adequately complied. The Service specifically addressed the possibility of creating DMAs to study island biogeography. The Service concluded that setting aside the preferred alternative to establish this study area in Nicolet would likely cause "a reduction of services in the next ten years and in the long run." Nicolet ROD at 17. The Service did not, however, think that the setting aside of land in Chequamegon would impact goods and service there. Chequamegon ROD at 18. Nonetheless, the Service determined that while the theory was "of interest," there was "conflicting scientific evidence regarding the necessity of providing large areas of old growth habitat," especially in a region like the Lake States area. Nicolet ROD at 17; Chequamegon ROD at 19. Thus, "there is not sufficient justification available to make this study a priority for Forest Service research at this time." Nicolet ROD at 17-18; Chequamegon ROD at 19. The Service allowed for the possibility that such a research proposal could be presented at a later date under the management plan as a site-specific proposal. Nicolet ROD at 18; Chequamegon ROD at 19. This analysis of conservation biology appears to us to more than adequately meet whatever burden [§ 1502.22](#) placed on the Service. The Supreme Court has noted that [§ 1502.22](#) was *624 designed to promote the functions of an EIS, "requiring agencies to take a 'hard look' at the consequences of the proposed action," by helping to "generate information and discussion on those consequences of greatest concern to the public and of greatest relevance to the agency's decision." [Methow Valley, 490 U.S. at 356, 109 S.Ct. at 1849](#) (citations omitted). The FEISs and RODs for both the Nicolet and the Chequamegon show that that information and discussion was generated.

V.

The creation of a forest plan requires the Forest Service to make trade-offs among competing interests. See [Sierra Club v. Espy, 38 F.3d at 802](#). The NFMA's diversity provisions do substantively limit the Forest Service's ability to sacrifice

diversity in those trades, and NEPA does require that decisions regarding diversity comply with certain procedural requirements. However, the Service neither ignored nor abused those limits in the present case. Thus, while the Sierra Club did have standing to challenge the choices made by the Service, the Service made those choices within the boundaries of the applicable statutes and regulations.

For the foregoing reasons, we affirm the decisions of the district court.

AFFIRMED.

46 F.3d 606, 63 USLW 2497, 40 ERC 1065, 25 Env'tl. L. Rep. 20,514

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