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Fish and Wildlife Service

**Policy on Maintaining the Biological
Integrity, Diversity, and Environmental
Health of the National Wildlife Refuge
System; Notice**

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service**

RIN 1018-AG47

Policy on Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice.

SUMMARY: We (U.S. Fish and Wildlife Service) issue a final policy to guide personnel of the National Wildlife Refuge System (System) in implementing the clause of the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act) directing Secretary of the Interior to ensure that the "biological integrity, diversity, and environmental health" of the System is maintained. This policy applies to all units of the System. The policy is an additional directive for refuge managers to follow while achieving refuge purpose(s) and System mission. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. Further, it provides refuge managers with an evaluation process to analyze their refuge and recommend the best management direction to prevent additional degradation of environmental conditions and, where appropriate in achieving refuge purpose(s) and System mission, restore lost or severely degraded components. Lastly, it provides guidelines for refuge managers to follow in dealing with external threats to biological integrity, diversity, and environmental health.

DATES: This notice is effective February 15, 2001.

FOR FURTHER INFORMATION CONTACT:

Elizabeth Souheaver, Acting Chief, Division Natural Resources, National Wildlife Refuge System, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, Room 670, Arlington, Virginia 22203; telephone (703) 358-1744. Please note that the full text of the policy appears at the end of this notice. In addition, the chapter will be available on the System web site [Http://refuges.fws.gov](http://refuges.fws.gov), select link to "Administration: Federal Register Notices" * * * then click on "2001 Notices" to find "Biological Integrity, Diversity, and Environmental Health."

SUPPLEMENTARY INFORMATION:**Disposition**

We published a notice in the **Federal Register** on January 23, 1998 (63 FR 3583) notifying the public that we would be revising the Fish and Wildlife Service Manual, establishing regulations as they relate to the Refuge Improvement Act, and offering to send copies of specific draft Fish and Wildlife Service Manual chapters to anyone who would like to receive them. We published a proposed policy notice in the **Federal Register** (65 FR 61356) on October 17, 2000 with a 45-day comment period ending on December 1, 2000. We extended that comment period to December 15, 2000 with a notice published in the **Federal Register** on December 4, 2000 (65 FR 75731).

The proposed policy was derived from Section 5(a)(4)(B) of the Refuge Improvement Act that the Secretary of the Interior "ensure that the biological integrity, diversity, and environmental health of the System are maintained * * *". The policy presented in this notice is a final policy that has been modified after consideration of public comment. The finalized policy will constitute part 601 Chapter 3 of the Fish and Wildlife Service Manual.

Purpose of This Policy

The purpose of the policy is to provide guidance for maintaining, and restoring where appropriate, the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.

Response to Comments Received

The combined comment periods totaled 60 days. We received 106 comments from the following sources: Non-governmental organizations (36); State agencies or commissions (31); Federal agencies or facilities (9); local or county governmental agencies (3); and individuals (24). The key points raised by these comments fell into 10 general categories:

- Creation of the term "ecological integrity" and its definition;
- Definition of the term "natural conditions" and application of the concept in management;
- Impact of the policy on the ongoing refuge management activities;
- Impact of the policy on recreational use of refuges, primarily hunting and fishing;
- Concern that the policy would not meet specific refuge purpose(s) in favor of the System mission or some other management direction;
- Concern that the policy might adversely affect private property rights of refuge neighbors, and does not

adequately recognize the State interests in how we manage refuges;

- Confusion regarding management for biological integrity, diversity, and environmental health at various landscape scales;
- Concern that the policy contains too many exceptions;
- General support either for the entire policy or significant elements of it; and
- A collection of other issues.

We read and addressed all the comments in the categories cited above. These comments, as well as any resulting changes to the policy, are cited below. Eight response letters included comments which were not relevant to the policy. These were not addressed.

Issue 1: The Term "Ecological Integrity"

Comment: Most of the commenters (9 of 14) who cited this term stated that it went beyond the Refuge Improvement Act by creating a term that was not contained in the law or legislative history. Another stated it provided managers too much latitude to threaten private landowners. Still others stated it was too academic and basically unnecessary to meet the requirements of the Refuge Improvement Act. One commenter supported the term but stated the definition needed further refinement pursuant to scientific literature and that we should provide more guidance as to how to measure it.

Response: We never intended for the term "ecological integrity" to be more than a convenient means of referencing the terms biological integrity, diversity and environmental health. We agree, however, that as we used the term throughout the policy it appeared to take on meaning beyond the reference to the three terms. We abandoned the term in the final policy and substitute its appearance with the three specific terms as they appear in the law.

Issue 2: The Definition of the Term "Natural Conditions" and Its Application in Management

Fifty-nine of 106 commenters made specific references to the definition of natural conditions. Of these, 14 generally favored the concept and the remainder expressed concern about the concept and/or its application in management. An additional 9 commenters indicated general support for the policy overall, thus indicating support for the concept as well. However, even the 14 commenters who specifically endorsed the concept did so with various qualifications or suggestions. Overall, the commenters raised the following concerns:

Comment: A reference period is unnecessary, since the Refuge

Improvement Act merely requires us to maintain the biological integrity, diversity, and environmental health necessary to meet refuge purposes.

Response: We believe the use of a reference point is pivotal to compliance with the mandate of the Refuge Improvement Act to ensure the maintenance of biological diversity, integrity, and environmental health. To implement the Refuge Improvement Act mandate, we needed definitions for the three terms. We believe a reference period is a critical element in these definitions and thus critical to the assessment of current habitat and wildlife conditions.

Comment: A frame of reference from which to manage is a good idea, but as defined and proposed it is unworkable. Five commenters suggested referencing natural dynamics or processes rather than "conditions;" and four others suggested using "historic range of variability" instead of "natural conditions," as the U.S. Forest Service has done in its "National Forest System Land Resources Management Planning" rule. Several who expressed general disfavor with the policy qualified their comments by suggesting they might accept a more historical reference period rather than a 1,000-year period. Several simply stated we needed something more flexible, achievable, and open to interpretation.

Response: In using the term "natural conditions" relative to a specific period (*i.e.*, 800 to 1800 AD), we chose an approach with scientific underpinnings very similar to those of the Forest Service. We attempted to go a step further, however, by assigning a specific frame of reference from which to work. Our intent in using the period was not to suggest a return to some particular community or habitat but, in fact, to reference something within the historic range of variability as found within that time frame. Section 3.14 of the draft policy noted that we are interested in the "scale and frequency of processes," and managing or restoring a particular site could include any of a range of successional seres or stages that might have occurred on that site within the 1,000-year time frame. Notwithstanding, the way the draft policy presents this concept clearly created a catalyst for controversy among reviewers, and while nine commenters supported the concept with some variation, the great majority expressed strong concern. Thus, we agree that the term "natural conditions" and the implications for management in the framework we have described should be removed from the policy. Instead, we adopted the more general and open-ended term, "historic

conditions," which we refer to as the condition of the landscape in a particular area before the onset of significant, human-caused change. See final policy Section 3.12. On that basis, we refined the definitions of biological integrity and environmental health to mean composition, structure and functioning of ecosystems "comparable to historic conditions." The intent is to emphasize not a particular point in time, but the range of ecosystem processes and functions that we believe would have occurred historically.

As developed in the final policy, this "historic" framework incorporates those comments that suggested one simply reflect conceptually on what used to be on the landscape before it underwent major change. In this regard, we have reworded language to clearly emphasize the use of the historic perspective as a starting point for assessing the condition of the landscape, the potential for restoration of habitats where appropriate, and the recognition of irrevocable changes that may preclude or greatly limit restoration. We note that where restoration is impractical, the historic perspective, coupled with the refuge purpose(s) and the System mission, may suggest appropriate and useful habitat management alternatives.

Comment: The time frame to be used as a baseline for natural conditions was arbitrarily chosen and speculative. Managing for natural conditions as proposed is effectively managing for a "snapshot" in time.

Response: We chose the time frame of 800–1800 in keeping with the Refuge Improvement Act, and it was the result of professional judgment with a scientific basis. We began with two premises: (1) "Integrity" and "health" suggest nondegraded conditions, and loss of integrity and health constitutes degradation; and (2) Assessing current degradation requires a benchmark or standard from which to measure. Some stated that the benchmarks for a refuge should be the conditions at time of acquisition, but we viewed that as unacceptable since we acquire many refuges in already extremely degraded condition. The point is to have a benchmark against which to assess such condition and that information will provide some suggestion to a refuge manager regarding a management direction as they attempt to repair such degradation. For our benchmark in the draft policy, we carefully chose a roughly 1000-year time frame during which ecological science tells us we could have expected the full historic range of variability to have occurred within the plant communities which form the basis of habitats for wildlife

species. We intentionally chose a relatively modern starting point (800 AD) so as to preclude an argument for Pleistocene flora and fauna, and we carefully chose the end point to be somewhere between European settlement and the onset of the industrial era because that period marked the onset of significant and extensive change in landscapes within the continental United States. The period chosen was very recent in a geologic sense, yet encompassed a range of temperature extremes. This was critical since temperature is one of the most important factors determining ecological composition, structure, and functioning. Given the temperature extremes and time period, and the fact that virtually all modern vegetative communities are thought to have been established by then, 800 AD seemed a reasonable and objective choice to initiate the frame of reference. The relatively extensive and rapid environmental degradation so recognizable today began with the land-intensive practices of pre-industrial European settlers, and accelerated rapidly with the onset of the industrial era. Thus, the period between European settlement and the onset of an industrial era presented an objective endpoint to the frame of reference we chose. However, we recognize the confusion and distraction that this time period has caused, and we have abandoned a specific time period in the final policy. We are now using a more open-ended reference to historic conditions (see Section 3.12 in the final policy).

Comment: Managing for natural conditions, however defined, precludes or preempts managing for specific refuge purpose(s) OR in a related vein, because purposes come first and often entail maintenance of highly artificial conditions, the policy becomes one of exceptions.

Response: Despite the many commenters who inferred otherwise, the draft policy was not intended to be a mandate for refuges to give up current management practices and return to "natural conditions." (See Issue 3: Implications for Refuge Purpose(s) and System Mission below.) One of the difficulties of developing the proposed policy was reconciling the highly artificial and intensively managed nature of many refuges with the Refuge Improvement Act's mandate that we ensure the biological integrity, diversity and environmental health of such refuges. Given the historical needs and thus purpose(s) for which refuges were established, there are indeed a variety of management circumstances directing refuge management. This policy does

not instruct managers to ignore refuge purpose(s). Rather, it says that when they select management actions that fulfill purpose(s), they should do so following as closely as possible the guidelines provided in this policy while still keeping their obligations to purpose(s) at the forefront. The final policy also emphasizes that much land on a refuge is not directly manipulated in pursuit of purpose(s) and thus managers often have much leeway to protect such tracts from further degradation and, where appropriate and feasible, to restore them as nearly as possible to communities and habitats that might reasonably be thought to have existed historically.

Ultimately, the final policy resolves much of this concern by using "historic conditions" rather than "natural conditions," and by emphasizing the historical perspective as primarily a starting point for choosing management directions and strategies. Also, in the final policy, we have changed any language which might mistakenly be interpreted as directing a return to natural conditions as a management mandate.

Comment: There is no quantitative ecological data available for the 1,000-year reference period. Thus managers would often manage from speculative, often undocumented accounts, and would have nothing quantitative from which to measure progress towards objectives.

Response: Most ecological information is a mixture of quality and quantity, and information on natural conditions is likewise. For example, qualitative information includes which types of plant communities existed in an area during the frame of reference, while quantitative information includes acreage estimates for such plant communities. The final policy continues to provide managers with suggested sources for historic information. However, managers will make the final decisions for determining historic conditions based on sound professional judgment.

Comment: Natural conditions, as defined, are simply not attainable in today's highly altered landscapes, particularly on intensively managed refuges.

Response: The intent of the draft policy was not to attain or re-create natural conditions, but to use natural conditions as a frame of reference for maintaining existing levels of biological integrity (including natural levels of biological diversity) and environmental health. The final policy clearly states our intent to prevent further degradation from historic conditions of biological

integrity, diversity and environmental health. We indicate this in Section 3.7 D. of the final policy.

Comment: The policy discounts or ignores the role of humans, especially Native Americans, in shaping landscapes, and implies that there is no place for humans in modern landscapes restored to or managed for natural conditions.

Response: We see that the most natural, intact, and functioning systems are those that have not been impacted by extensive and intensive landscape alterations. Recognition of human impacts on the landscape demonstrates the difference between ecosystems functioning today versus those found prior to substantial landscape changes. We use this information to inform and encourage managers to reflect on the natural ecosystem functions and processes that are necessary to maintain or restore the most viable ecosystem function or processes, and especially those that are necessary to achieve refuge purposes and the System mission. Permanent human alterations to the landscape are a reality and may not be restored and must be managed to maintain the existing levels of biological integrity, diversity and environmental health.

Issue 3: Implications for Refuge Purposes and System Mission

Comment: We received several comments addressing concerns that this policy would have impacts on refuge purposes or affect the System mission. There were 17 comments that interpreted this policy as having a negative impact on refuge purposes; these ranged from some interpretations that this policy would replace refuge purposes to a concern that the policy does not clearly emphasize the priority of refuge purpose(s) over ecological integrity.

Response: In response, we changed the final policy Section 3.7 B. from "Maintaining Biological Integrity of the System and Accomplishing Refuge Purposes," to "Accomplishing Refuge Purposes and Maintaining Biological Integrity, Diversity, and Environmental Health of the System." Further, Section 3.7 B. clearly states the priorities for refuge purposes, System mission, and maintenance of biological integrity, diversity and environmental health.

Comment: One commenter felt that the Ecological Integrity Policy and Refuge Improvement Act should take precedence over, or replace refuge purpose(s).

Response: The fulfillment of refuge purpose(s) is a nondiscretionary statutory duty of the Service. However,

the law also requires that we ensure that the biological integrity, diversity, and environmental health of the System is maintained, and therefore, this is an additional duty which we must fulfill as we endeavor to achieve refuge purpose(s) and System mission.

Comment: We received one comment concerning discrepancies between System mission and refuge purpose(s) which inquired as to how often we evaluate and change refuge purpose(s).

Response: Typically, the fulfillment of refuge purpose(s) is consistent with achieving the System mission, but where there are exceptions, refuge purpose(s) take precedence. We evaluate refuge purpose(s) prior to any significant actions proposed on a refuge, but refuge purpose(s) do not change.

Comment: There were two comments that perceived a conflict between the statement that "we may compromise the ecological integrity of a refuge for the sake of maintaining a higher level of ecological integrity at the System scale" and the statement that "conflicts will be resolved in a manner that first protects the refuge purpose(s)."

Response: This is a comparison of different issues. We have statutory obligations to fulfill refuge purpose(s) and to protect the biological integrity, diversity and environmental health of the System. Basically, the sentences are meant to convey that biological integrity, diversity and environmental health on an individual refuge may sometimes be compromised when a purpose requires alterations of the landscape to accommodate a broader System need (such as intensively managed feeding or resting areas for migratory waterfowl). In such a case, addressing the flyway needs of waterfowl provide diversity and integrity at a larger landscape.

Comment: Another comment was received expressing concern that promoting ecological integrity of the System might have impacts on ecological integrity for specific refuges.

Response: This is, in fact, the case as noted above. It may sometimes be necessary to compromise the biological integrity, diversity, and/or environmental health of a given refuge in favor of the greater resource needs at the System landscape scale. We will not, however, compromise the fulfillment of individual refuge purposes.

Issue 4: Impacts on Public Use, Especially Hunting and Fishing

We received 34 letters that addressed the relationship between the draft policy and its relationship to public uses on refuges and public use as

mandated under Refuge Improvement Act.

Comment: More than half of these letters (17) were concerned that the policy, as drafted, would interfere with or eliminate hunting and fishing on refuges while another 13 letters were concerned that this policy would affect or find all public uses incompatible with ecological integrity.

Response: We did not write the draft policy with the intent or direction to eliminate hunting, fishing, or other priority public uses recognized by the Refuge Improvement Act. This draft policy rarely mentions public use, but where it does, the purpose is for refuge managers to consider impacts on wildlife and habitat (*i.e.*, biological integrity, diversity, and environmental health) when implementing public uses. The authority for this draft policy is the Refuge Improvement Act, which also clearly identifies hunting and fishing as priority public uses. Section 2.(6) of the Refuge Improvement Act states, "When managed in accordance with principles of sound fish and wildlife management and administration, fishing, hunting * * * in national wildlife refuges have been and are expected to continue to be generally compatible uses." In order to clearly address concerns over priority public uses, we have added Section 3.7 G. "Principles Underlying This Policy, Public Use", to the final policy. A summary of this section is as follows: The Service reiterates the importance of the public being able to utilize refuges for those priority public uses, including hunting and fishing. The six priority wildlife-dependent public uses identified in the Refuge Improvement Act are generally not in conflict with management for the biological integrity, diversity, and environmental health when compatible with refuge purpose(s). Restoration of historical landscapes as they appeared prior to significant disturbance does not generally mean exclusion of visitors. But we direct refuges to use spatial or temporal zoning to manage public visitation in a way that it complements efforts to protect and, where appropriate, restore historic habitats and wildlife populations. In addition, fishing programs on refuges will not be terminated in pursuit of biological integrity, diversity, and environmental health because managed fishing programs on refuges do not impact fish population viability.

Comment: A few letters specifically question the relationship between ecological integrity and compatibility determinations used for permitting hunting and fishing.

Response: We determine compatibility of a priority public use on a refuge by comparing that use to the purpose of the refuge and the mission of the System. If we determine a use to be compatible, then we facilitate it. However, that does not preclude administration of those public uses in such a way as to promote biological integrity, diversity, and environmental health, and the Refuge Improvement Act directs managers to do so. In such cases, a refuge may carefully plan the location, size, and use of structures for an environmental education program, for example, perhaps adopt hunting regulations (*e.g.*, antlerless deer hunts) more restrictive than those of a respective State. Because the use of the words "conflict with" confused this issue, we have deleted the sentence that contains it.

Comment: There also were a few letters that felt the policy will find public use structures such as boardwalks, roads, observation towers, and similar facilities in conflict with ecological integrity. The draft policy says that "Where feasible, we also pursue ecological integrity by eliminating unnatural biotic and abiotic features and processes not necessary to accomplish refuge purposes."

Response: The purpose of this section of the policy is for managers to consider ways to minimize impacts on biological integrity, diversity, and environmental health when planning structures and facilities by placing them in the most suitable location to allow quality public use while still ensuring biological integrity, diversity, and environmental health.

Comment: A few letters thought that hunting, fishing and trapping should not be permitted on refuges because they interfere with ecological integrity, while one letter wanted "trapping" added to Section 3.14 where hunting and fishing are encouraged in cooperation with State fish and wildlife management agencies.

Response: The six priority wildlife-dependent uses are given special status by the Refuge Improvement Act, which specifically recognizes hunting, fishing, wildlife observation, photography, interpretation, and environmental education. Refuges must facilitate these uses when compatible. The Refuge Improvement Act does not similarly recognize trapping.

Issue 5: Implications for States and Other Partnerships

Comment: Various States commented that the policy should place emphasis on cooperation and coordination with

States in the management of wildlife populations on refuges.

Response: Strong partnerships with the respective States are an essential part of all refuge planning and management, including the maintenance of biological integrity, diversity, and environmental health of refuges. We encourage and expect managers to forge effective partnerships with States through cooperation and coordination in the management of wildlife habitats and populations found on refuges. We have changed the language in the final policy, Section 3.14, to more clearly state this expectation.

Issue 6: Implications for Private Property Rights

Comment: Several commenters were concerned that the policy was not mindful of the property rights of others and encouraged managers to seek resolutions to problems injuring resources on refuges through litigation.

Response: We changed Section 3.20 of the final policy to emphasize that the preferred course of action for managers in cases of injury to refuge resources from outside sources is first to seek cooperative resolution to such conflicts through neighborly discussion, negotiation, and consultation. This includes working with State or local agencies and other third party interests to seek solutions of mutual satisfaction. The revised policy offers several steps for a manager to take in this regard. Ultimately, however, and with full respect of private property rights, we recognize our responsibility to protect the property and resources of the American public, and state the responsibility to do so.

Issue 7: Implications for Wildlife and Habitat Management on Refuges

Comment: We received many comments which expressed concern about the role of active management on refuges under the proposed policy. These comments noted that active management is often necessary to achieve refuge purpose(s). Some felt management for natural conditions basically implied an absence of management and would, therefore, conflict with achieving refuge purpose(s). Comments also noted that numerous refuges are located in highly altered landscapes where active management is needed to maintain wildlife values of the refuge. A few comments identified that active management actions are required to maintain desirable wildlife populations where habitats surrounding the refuge have been degraded.

Response: We acknowledge that active management is often critically important to achieve refuge purpose(s). We also acknowledge that at some refuges very intensive management actions are required to maintain high densities of some wildlife species. We will continue active management where needed. However, we will evaluate management practices on all refuges to ensure that we take appropriate management action to achieve refuge purpose(s), while at the same time addressing the guidelines identified in the final policy.

Comment: Numerous comments noted that identifying "natural conditions" during the time period 800 AD to 1800 AD and then managing for conditions identified during that period was inappropriate and was contrary to Service mandates to achieve refuge purpose(s) which necessitate active management.

Response: As noted throughout the policy and in above responses to comments (see Issue 3: Implications for Refuge Purpose(s) and System Mission), nothing in this chapter places management for biological integrity, diversity, and environmental health above refuge purpose(s). However, we still need a reference period to assess the condition of a refuge and to provide a management perspective. In the final chapter, we propose to use historic conditions to assess the status of refuges in relation to conditions present before man substantially altered the landscape. We will use this historic reference to identify appropriate ranges of habitats that may occur at a refuge, which species of wildlife should occur, and what processes that shaped these habitats still exist. We will maintain processes which are still extant. We will mimic processes which no longer exist or have been altered in our management actions or, where appropriate and feasible, restore them if possible. Due to the highly altered landscapes in which many refuges exist, we acknowledge that extensive active management actions are required to mimic these natural processes to achieve refuge purpose(s). We also acknowledge that numerous refuges have been so drastically altered that it may be infeasible to restore the historic conditions of biological integrity, diversity, and environmental health.

Comment: Other commenters were concerned that the extent and types of active management were left too much to the discretion of the Refuge Manager. They felt that such discretion would lead to inconsistencies in refuge management practices.

Response: The Refuge Manager is the first line manager responsible for all aspects of management of a refuge. The Refuge Manager is the individual most knowledgeable about conditions at each refuge. It is the manager's responsibility to identify appropriate management for the refuge. However, we acknowledge that inconsistencies do occur. To minimize this concern, we have instituted numerous review and approval processes for what managers propose. Examples of these review and approval processes are refuge management plans, Comprehensive Conservation Plans, National Environmental Policy Act guidelines, Endangered Species Act, Section 7 regulations and guidance, and individual refuge program reviews. All of these require some form of Regional Office oversight and/or public input and comment.

Comment: A few comments were concerned that refuges should not manage for natural densities, age structures, and sex ratios of large ungulates and other fish and wildlife populations mainly because this may not be in keeping with State management objectives and or may not be feasible.

Response: The final policy directs refuges to work cooperatively with the States devising appropriate harvest strategies to achieve these objectives, recognizing that the refuge management objectives may differ from those of the State. In such cases, refuges may implement regulations more restrictive than those of their respective States in pursuit of more natural sex and age structures. We will not take such actions without consulting State fish and wildlife management agencies.

Comment: A few comments identified concerns for public health, related to natural production of insects which are vectors of disease. It was proposed that management of vector populations should be included in this policy in a manner that is consistent with protection of the natural resources that exist within the refuge.

Response: We also are very much concerned about threats to human health. However, our mandate is to manage for "Wildlife First," and in numerous situations management to eliminate or reduce insect vectors will adversely impact the quality of food chains and wildlife habitats at a refuge, so we intend to continue to follow our current policy of taking action to reduce vector populations only when needed to address a Declared Human Health Emergency. We are working with agencies responsible for vector control to identify vector management practices,

which we can use on refuges while not compromising the purpose(s) of the refuge or System mission. In emergency events, such as a Declared Human Health Emergency, the Service and responsible agencies will work together to address these situations.

Comment: One comment addressed the need to introduce large predators to maintain some wildlife populations.

Response: We agree that predators are an important component of System biological integrity and diversity. To this end, we have undertaken programs to reintroduce predators to some refuges where this action is feasible. At other refuges, efforts are being made to maintain declining populations of some predatory species. Where introductions of large predators may be feasible at a refuge, we would undertake a thorough public scoping process to identify how this action may impact local communities. In cases where key predator species cannot be feasibly reintroduced, we may employ management practices, including hunting programs, to both provide recreational opportunity and improve biological integrity by maintaining natural densities of certain wildlife prey species.

Issue 8: Implications of Policy at Different Landscape Scales

Comment: There were 12 letters that raised issues of scale and the definitions and references to landscapes.

Response: Use of the term "local landscape" in the draft policy caused some confusion among these commenters. We intended the term to describe the refuge and its immediate surroundings. In the final policy, we dropped the "landscape" part of the term and use "local scale" or "refuge scale" to refer to a refuge and the area around it.

Comment: The majority of other comments on this issue related to how integrity will be maintained at various scales.

Response: It is important to stress that this policy does not authorize or suggest that refuge staff will manage lands outside their boundaries. However, it does provide clear direction that refuge managers must examine the context of their management actions at the refuge scale and all scales up to the international scale. Within each refuge there is a certain amount of biological diversity, integrity, and environmental health that contribute to these conditions at a local scale. However, as part of larger systems, each refuge must examine its contributions to objectives that have been developed at larger scales through initiatives such as the

North American Waterfowl Management Plan or Partners in Flight. Refuges must continually reassess their contributions in light of new information and new initiatives, such as the North American Bird Conservation Initiative. As noted throughout the policy, refuges must seek to identify their most important contributions to these higher levels. Sometimes this will mean sacrificing biological diversity and integrity at the local scale in order to contribute to diversity at a larger scale, while at all times managing for refuge purpose(s).

Comment: Two reviewers asked for definitions of landscapes within which refuges will operate.

Response: There is no single answer to this question. Refuges operate at many different scales, and landscapes are not always defined the same way. For example, we develop our ecosystem teams within major watersheds, while Bird Conservation Regions of the North American Bird Conservation Initiative are defined using ecoregions developed by the Commission for Environmental Cooperation. The continual challenge for refuge managers is to achieve refuge purpose(s) while evaluating the refuge's most significant contributions to regional, national, and international goals and objectives.

Comment: One reviewer observed that the System is not an ecological system.

Response: This is true. It is a System of lands that is administratively bound together and for which the Refuge Improvement Act has set certain standards for management. While not all refuges are connected ecologically, many refuges are, particularly those located along migratory bird pathways. This policy directs those refuges that are connected ecologically to examine their roles in the context of purpose(s), but also in the context of maintaining, and when appropriate, restoring biological integrity, diversity, and environmental health at all levels. In doing so, all refuges contribute to the maintenance of biological integrity and diversity, and environmental health, of the System.

Issue 9: Other Issues

Sixty-two commenters raised numerous "other" issues and concerns in addition to those major categories addressed above. Typically, any given concern was addressed by perhaps 10 or fewer commenters. We group these as "other" issues and address them below:

Comment: Seven commenters raised the concern that the policy will have a profound effect on local tax bases, local economies, and property rights through land protection and acquisition. They expressed fears about land acquisition and managers pursuing civil action

against neighbors whose actions damage refuge resources. Three felt the policy constitutes a significant Federal action under NEPA and requires an environmental impact statement.

Response: We feel these fears are ungrounded. The policy will not accelerate the rate of land acquisition within the System. The policy creates no new authorities for refuge managers, nor do we expect it to create significant new conflicts among managers and private landowners. On the contrary, it emphasizes partnerships and similar cooperative avenues to resolve conflicts (See Issue 6: Implications for Private Property Rights). Section 3.20 of the final policy emphasizes that we will take any resolution of conflicts with full respect of private property rights. We will follow NEPA guidelines when refuge managers implement this policy in refuge Comprehensive Conservation Plans, compatibility determinations, and other interim management plans.

Comment: The definition of "sound professional judgment" is unnecessary or goes beyond the Refuge Improvement Act. Seven commenters made these remarks, including one who believed the concept of allowing individual managers to interpret management needs was unsafe because of their different backgrounds and biases. Another believes the policy should incorporate more oversight of refuge managers to address this concern and let comprehensive conservation planning (CCP) teams make judgments. Another wanted to know who a refuge manager might consult with outside the Service in making management decisions.

Response: We deleted the term "sound professional judgment" from the definitions of the final policy because we already defined it in the Compatibility chapter (see 603 FW 2). We maintained the term as integral to the final policy, which we believe is in keeping with the Refuge Improvement Act. We concur that refuge managers will make different interpretations of management needs in different situations, and there is value to group processes. However, we must still empower refuge managers to make the decisions inherent to administering a refuge. The refuge manager is the individual with the most holistic, on-the-ground knowledge of the circumstances surrounding management operations. It is typical for refuge managers to maintain close working relationships with State agencies, neighboring landowners, academics, conservation organizations, and/or local government, many of whose concerns are addressed in choosing management direction.

Comment: The policy is not properly presented in the context of the Refuge Improvement Act and other policies. Six commenters stated the policy inappropriately elevates the Refuge Improvement Act's mandate to "ensure * * * biological integrity, diversity and health" above thirteen other directives found in Section 5 of the Refuge Improvement Act. Some also felt we should explain how the policy will be interpreted in the context of other Service policies.

Response: The policy on biological integrity, diversity, and environmental health is a new policy which has not previously existed in other forms. We already address virtually all other directives of the Refuge Improvement Act in some form in existing policies, which we are updating as necessary to incorporate these directives. The policy is not intended to elevate biological integrity, diversity and environmental health above the other directives, though we do believe and state in Section 3.7 A. of the final policy that biological integrity, diversity and environmental health are "intrinsic and high priority components of wildlife conservation" and thus important to the "Wildlife first!" principle.

Comment: Two comments voiced the concern that we provide no direction for measuring and evaluating results.

Response: We provide ample guidance on management through goals and objectives and adaptive management in 602 FW 1-4 (policies related to comprehensive conservation planning) and the related Writing Refuge Management Goals and Objectives: A Handbook. Section 3.19 B. of the final policy specifies that we will develop goals and objectives for maintaining biological integrity, diversity, and environmental health into Comprehensive Conservation Plans.

Comment: Eight commenters expressed some variation of "The policy is unfocused, ambiguous, not achievable, and a catalyst for litigation."

Response: We feel the various changes to the policy incorporating such comments (e.g., use of "historic conditions" rather than "natural conditions," modification of the frame of reference, etc.) have addressed this concern by simplifying and focusing the language.

Comment: One commenter held the view that this policy is unnecessary.

Response: We disagree based on the Refuge Improvement Act mandate.

Comment: One commenter commented on the use of prescribed fires and wildfires * * * that the policy might result in greater use of prescribed fire as a management tool, and noted

that use of fire must include consideration of air quality impacts.

Response: Fire is already a much-used and significant management tool on refuges, and we do not anticipate a marked increase in its use as a result of this policy. Coordination of controlled burns with State air quality agencies is standard procedure for refuges, and that will not change under this policy.

Comment: One commenter stated we should avail ourselves of new technology, regardless of whether it mimics nature.

Response: We disagree that all new land management technology is appropriate for refuges. We encourage refuges to utilize the tools that are available and most efficient for accomplishing refuge objectives while remaining in compliance with existing policy.

Comment: One commenter held the view that the policy "second guesses" nature by promoting the creation of natural disasters like floods and fires.

Response: The policy promotes mimicking the results of such disasters through the application of prescribed fires and moist soil management. It does not advocate creating them on historic scales.

Comment: How do we deal with native but nonindigenous species that utilize the "artificial" habitats created by much of traditional refuge management? Two commenters noted that such species now utilize niches created in habitats that did not exist historically.

Response: We often create such habitats on refuges in order to accomplish a refuge-specific purpose (e.g., creation of marsh habitat where none previously existed). As noted in various places throughout the draft and final policies, actions taken in pursuit of purpose(s)—and by implication the results of those actions—(e.g., the population of new habitats by species which do not previously occur in an area) take precedence over any conflicting elements of this policy.

Comment: We received one comment that the Endangered Species Act is minimized in the policy and not elevated above other refuge priorities.

Response: We recognize several statutes, including the Endangered Species Act, that provide direction for management of national wildlife refuges. We expect refuge managers to follow all relevant environmental compliance statutes in the execution of this policy.

Comment: One commenter voiced the concern that Section 3.10 unnecessarily references "evolution" as part of the natural processes on refuges.

Response: We disagree because it does not detract from the policy, and we feel that it is relevant.

Comment: Relationship to the "Wildlife First!" principle: Four commenters addressed the relationship between biological integrity, diversity and environmental health and the "wildlife first" mandate of the Refuge Improvement Act. One wanted the "wildlife first" idea removed in favor of public uses. Others agreed with the "wildlife first" principle, but not to the diminution of public use.

Response: This would be in conflict with the purpose and mission of refuges and the Refuge Improvement Act that clearly place wildlife and habitat as the first priority on refuges. These concerns were addressed in the above section on public use (Section 6: Impacts on public use, especially hunting and fishing).

Comment: One commenter voiced the concern that the policy attempts to nullify important elements of the Alaska National Interest Lands Conservation Act (ANILCA), referencing two elements of the draft policy that seemed to imply this. First was the draft policy's heavy emphasis on "natural conditions," which the commenter interpreted as a "back to nature policy."

Response: While we believe the commenter misinterpreted the draft policy, we nevertheless abandoned the concept of "natural conditions" in favor of the more appropriate and open-ended "historic conditions" and clarified the way this frame of reference would be utilized in management. Second, the commenter felt the draft policy was anti-public use, and thus in opposition to ANILCA. We have clarified this by adding "recognizing public use as an underlying principle of biological integrity, diversity and environmental health" in Section 3.7 G. of the final policy. That section emphasizes the appropriateness of public use on refuges and clarifies the relationship between public use and biological integrity, diversity, and environmental health. In any case, Section 9 of the Refuge Improvement Act explicitly reiterates support for ANILCA by noting that any conflicts between the two Acts will be resolved in favor of ANILCA. The present policy cannot override the statutory language.

Comment: One commenter felt the biological integrity discussion is inadequate. Section 3.10A. of the draft policy should be expanded to include the "natural functioning of ecosystems" and the "spatial distribution of species within a landscape" and should also "incorporate ecosystem service provided by fully functioning natural ecosystems."

Response: We feel our discussion in the final policy implicitly and adequately includes these concepts as written. The same commenter felt we should recognize the value of recolonization by native species over physical reintroductions of such species. We concur with the commenter and favor recolonization where source populations are available; however, where no such source is available, we advocate reintroduction.

Comment: The policy needs to be simplified.

Response: We concur and incorporated significant changes into the final policy to accomplish this. Most notably, we modified the definition of "natural conditions" to "historic conditions" and deleted extensive sections of text in support of natural conditions. We simplified related definitions, and we added language to clarify the relationships among refuge purpose(s), public use, and "biological integrity, diversity, and environmental health."

Comment: What are the ramifications regarding State water rights, as well as State and local flood control projects? One commenter inquired as to how the policy might direct a manager to address water development upstream of a refuge that diverted water from a refuge. On a similar but opposite note, another commenter was concerned the policy would not allow diversion of flood waters onto refuges should the need arise as part of a local flood control effort.

Response: Nothing in either the draft or final policies is meant to suggest we will attempt to override or change the legitimate existing water rights of any party. However, if the actions of any party impinge on our legal water rights, we will take action to defend those rights as necessary. We expect refuge managers to review all controlling legal authorities, including appropriate statutes, establishing purposes, relevant Service policy, binding contracts and other legal considerations before entering into agreements regarding flood control and related issues. The present policy will not alone determine a course of action here, but rather the sum of all such considerations. Managers will undoubtedly take such action only in close consultation with their Regional solicitor.

Comment: In a comment concerning draft policy's emphasis of on-refuge research over off-refuge research, one letter believed Section 3.7G. ("Adaptive Management") of the draft policy inappropriately emphasized on-refuge research, and noted research off-refuge has value as well.

Response: We concur; however, in the final policy, we abbreviated the discussion of "Adaptive Management" and removed the references to research and other specific elements in the interest of brevity, so the question is moot.

Comment: Refuges should manage for as many species as possible once purposes are met. One commenter felt Section 3.11 of the draft policy should permit the introduction of as wide an array of species as possible on refuge, specifically any species that is in decline, whether or not it is listed.

Response: We disagree. Such an approach would produce diffuse and unfocused management, as well as defeat the intent of the present policy. Threatened and endangered species provide a clear, statutory responsibility not present with nonlisted species.

Comment: Several commenters felt that the draft policy ignored the role of humans in the ecosystems.

Response: Neither the draft nor final policy ignores the role of humans, but both imply that prior to European settlement and subsequent industrialization of the United States, humans existed in a somewhat steady state with the environment. While they indeed had an effect, smaller and more dispersed populations and lack of mechanized technology produced more of a harmony than we see today. The policy addresses the significant changes to landscapes that have occurred since European settlement.

Comment: One commenter felt the policy ignored ongoing significant ecological phenomena like glaciers.

Response: Section 3.14 of the draft policy states that we do not attempt to "correct" natural phenomena like volcanic eruptions and naturally impounded water. Both the draft and final policies recognize natural processes throughout without regard to scale.

Comment: One commenter felt that biological integrity, as the draft policy defines it, is not a major component of wildlife conservation.

Response: We disagree based on best available science.

Comment: Two commenters felt the policy should include a planning element to assure refuges address the practical considerations of meeting their purposes in the face of changing future conditions or to examine ways to balance the various management alternatives open to refuges under this policy.

Response: Other Service policies on comprehensive conservation planning (see 602 FW 1-4) provide a process for incorporating and reconciling refuge

purposes with the requirements of this policy.

Comment: Several commenters expressed concern that refuges do not have adequate staff or funds to meet the requirements of this new policy. One felt the policy will distance staff from their basic, more important administrative functions.

Response: We believe such concerns reflect a misinterpretation of the policy. In some regards, managing pursuant to this policy may require more staff, funds, or planning time; however, other changes in management philosophy, direction, or strategies will reduce staff and funds being expended on existing efforts. We also believe implementation of this policy is integral to the basic administration of a refuge.

Comment: The System's contribution to conservation should be that of a laboratory and teaching facility rather than conservation area. One commenter suggested wildlife can only be "saved" on private lands, so refuges should be dedicated to research, teaching, and extension.

Response: We believe this view to be counter to statutory mandate for the System found in the Refuge Improvement Act, as well as contrary to the long history and institutional culture of individual refuges and the System overall. Virtually all refuges are facilities for research, teaching, and outreach; but they also fulfill a vital conservation role among the broad mosaic of wildlife and habitat conservation efforts throughout the United States.

Comment: Thirteen commenters suggested we either withdraw the policy altogether or else withdraw it unless we incorporate significant changes.

Response: The final policy incorporates significant revisions that were meant to address the extensive concerns voiced about natural conditions, public uses, and partnerships with States and private landowners. Given this, we feel the policy merits publication.

Comment: Issues not relevant to the policy: Many reviewers, while addressing various aspects of the policy, expressed concerns such as tribal rights, taking of endangered species, refuge funding and administration, etc.

Response: We do not believe these concerns were applicable to the policy.

Issue 10: General Support

Nineteen commenters expressed general support of the draft policy as written, although 12 individuals qualified their support in various ways, suggesting different treatment of "natural conditions," more specifics on

public use, more clarity or language, etc. These supportive respondents were from a cross section of categories: four Federal agencies, five State agencies, four environmentally-oriented, non-governmental organizations, one sportsman's group, two academics, and three private individuals. One additional State natural resource agency specifically supported Section 3.7F. "Wildlife and Habitat Management." Additionally, several commenters specifically supported our proposal to manage ungulate populations for natural sex and age structure.

Supportive comments included the following: " * * * the draft policy was well written and understandable;" " * * * it establishes new and overdue philosophy;" " * * * it promotes wildlife first and active management when necessary;" " * * * it ensures consistency;" " * * * it is flexible;" " * * * it is scientifically credible and balanced;" " * * * it promotes landscape-scale conservation by allowing refuges to manage for habitats lost in other parts of the landscape, it allows for maintenance of a variety of habitat stages;" and " * * * it promotes cooperation with States, and it will help refuge managers implement the Refuge Improvement Act."

One supportive reviewer suggested that we expand the summary and clarify it to ensure that we emphasize the most important aspects of the policy. We revised the summary to incorporate this and other comments. Two reviewers suggested that the draft policy deals effectively with deer management issues. Two reviewers mentioned concerns about implementation but otherwise expressed general support.

Issue 11: Extension of Comment Period

Comments: Fourteen letters were received requesting an extension of the comment period, from 45 to 120 days. Four made open-ended extension requests, *i.e.*, with no extension period specified.

Response: We extended the period by 15 days, for a total comment period of 60 from the date of first publication.

The text of the final policy follows:

Fish and Wildlife Service

National Wildlife Refuge System

Refuge Management—Part 601 National Wildlife Refuge System

Chapter 3—Biological Integrity, Diversity, Environmental Health 601 FW 3

3.1 What Is the Purpose of This Chapter?

This chapter provides policy for maintaining, and restoring where

appropriate, the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.

3.2 What Is the Scope of This Policy?

This policy applies to all units of the System.

3.3 What Is the Biological Integrity, Diversity, and Environmental Health Policy?

The policy is an additional directive for refuge managers to follow while achieving refuge purpose(s) and System mission. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. Further, it provides refuge managers with an evaluation process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate and in concert with refuge purposes and System mission, restore lost or severely degraded components.

3.4 What Are the Objectives of This Policy?

A. Describe the relationships among refuge purposes, System mission, and maintaining biological integrity, diversity, and environmental health.

B. Provide guidelines for determining what conditions constitute biological integrity, diversity, and environmental health.

C. Provide guidelines for maintaining existing levels of biological integrity, diversity, and environmental health.

D. Provide guidelines for determining how and when it is appropriate to restore lost elements of biological integrity, diversity, and environmental health.

E. Provide guidelines to follow in dealing with external threats to biological integrity, diversity, and environmental health.

3.5 What Are Our Authorities for This Policy?

A. National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Refuge Administration Act)

The authority for this policy is the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Refuge Administration Act). Section 4(a)(4)(B) of this law states that "In administering the System, the Secretary shall * * * ensure that the

biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans * * *." This is one of 14 directives to the Secretary contained within the Refuge Administration Act.

3.6 What Do These Terms Mean?

A. *Biological diversity.* The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and communities and ecosystems in which they occur.

B. *Biological integrity.* Biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities.

C. *Environmental health.* Composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment.

D. *Historic conditions.* Composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human related changes to the landscape.

E. *Native.* With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

3.7 What Are the Principles Underlying This Policy?

A. Wildlife First

The Refuge Administration Act, as amended, clearly establishes that wildlife conservation is the singular National Wildlife Refuge System mission. House Report 105-106 accompanying the National Wildlife Refuge System Improvement Act of 1997 states " * * * the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first." Biological integrity, diversity, and environmental health are critical components of wildlife conservation.

B. Accomplishing Refuge Purposes and Maintaining Biological Integrity, Diversity, Environmental Health of the System

The Refuge Administration Act states that each refuge will be managed to fulfill refuge purpose(s) as well as to help fulfill the System mission, and we will accomplish these purpose(s) and

our mission by ensuring that the biological integrity, diversity, and environmental health of each refuge is maintained, and where appropriate, restored. We base our decisions on sound professional judgment.

C. Biological Integrity, Diversity, and Environmental Health in a Landscape Context

Biological integrity, diversity, and environmental health can be described at various landscape scales from refuge to ecosystem, national, and international. Each landscape scale has a measure of biological integrity, diversity, and environmental health dependent on how the existing habitats, ecosystem processes, and wildlife populations have been altered in comparison to historic conditions. Levels of biological integrity, diversity, and environmental health vary among refuges, and often within refuges over time. Individual refuges contribute to biological integrity, diversity, and environmental health at larger landscape scales, especially when they support populations and habitats that have been lost at an ecosystem, national, or even international scale. In pursuit of refuge purposes, individual refuges may at times compromise elements of biological integrity, diversity, and environmental health at the refuge scale in support of those components at larger landscape scales. When evaluating the appropriate management direction for refuges, refuge managers will consider their refuges' contribution to biological integrity, diversity, and environmental health at multiple landscape scales.

D. Maintenance and Restoration of Biological Integrity, Diversity, Environmental Health

We will, first and foremost, maintain existing levels of biological integrity, diversity, and environmental health at the refuge scale. Secondly, we will restore lost or severely degraded elements of integrity, diversity, environmental health at the refuge scale and other appropriate landscape scales where it is feasible and supports achievement of refuge purpose(s) and System mission.

E. Wildlife and Habitat Management

Management, ranging from preservation to active manipulation of habitats and populations, is necessary to maintain biological integrity, diversity, and environmental health. We favor management that restores or mimics natural ecosystem processes or function to achieve refuge purpose(s). Some refuges may differ from the frequency and timing of natural processes in order

to meet refuge purpose(s) or address biological integrity, diversity, and environmental health at larger landscape scales.

F. Sound Professional Judgment

Refuge managers will use sound professional judgment when implementing this policy primarily during the comprehensive conservation planning process to determine: The relationship between refuge purpose(s) and biological integrity, diversity, and environmental health; what conditions constitute biological integrity, diversity, and environmental health; how to maintain existing levels of all three; and, how and when to appropriately restore lost elements of all three. These determinations are inherently complex. Sound professional judgment incorporates field experience, knowledge of refuge resources, refuge role within an ecosystem, applicable laws, and best available science including consultation with others both inside and outside the Service.

G. Public Use

The priority wildlife-dependent public uses, established by the National Wildlife Refuge System Improvement Act of 1997, are not in conflict with this policy when determined to be compatible. The directives of this policy do not generally entail exclusion of visitors or elimination of public use structures, *e.g.*, boardwalks and observation towers. However, maintenance and/or restoration of biological integrity, diversity, and environmental health may require spatial or temporal zoning of public use programs and associated infrastructures. General success in maintaining or restoring biological integrity, diversity, and environmental health will produce higher quality opportunities for wildlife-dependent public use.

3.8 What Are Our Responsibilities?

A. Director

(1) Provides national policy, goals and objectives for maintaining and restoring the biological integrity, diversity, and environmental health of the System.

(2) Ensures that national plans and partnerships support maintaining and restoring the biological integrity, diversity, and environmental health of the System.

(3) Ensures that the national land acquisition strategy for the System is designed to enhance the biological integrity, diversity, and environmental health of the System at all landscape scales.

B. Regional Director

(1) Provides regional policy, goals and objectives for maintaining and restoring the biological integrity, diversity, and environmental health of the System, including guidance to resolve any conflicts with biological integrity, diversity, and environmental health at an individual refuge versus at the larger landscape scales.

(2) Ensures that regional and ecosystem plans, and regional partnerships support maintaining and restoring the biological integrity, diversity, and environmental health of the System.

(3) Resolves conflicts that arise between maintaining biological integrity, diversity, and environmental health at the refuge level landscape scale versus at larger landscape scales.

C. Regional Chief

(1) Ensures that individual refuge comprehensive conservation plans support maintaining and restoring the biological integrity, diversity, and environmental health of the System.

(2) Reviews and ensures those refuge management programs that occur on many refuges (*e.g.*, fire management) are consistent with this policy.

D. Refuge Manager

(1) Follows the procedure outlined in Section 3.9 of this chapter.

(2) Incorporate the principles of this policy into all refuge management plans and actions.

3.9 How Do We Implement This Policy?

The Director, Regional Directors, Regional Chiefs, and Refuge Managers will carry out their responsibilities specified in Section 3.8 of this chapter. In addition, refuge managers will carry out the following tasks.

A. Identify the refuge purpose(s), legislative responsibilities, refuge role within the ecosystem and System mission.

B. Assess the current status of biological integrity, diversity, and environmental health through baseline vegetation, population surveys and studies, and any other necessary environmental studies.

C. Assess historic conditions and compare them to current conditions. This will provide a benchmark of comparison for the relative intactness of ecosystems' functions and processes. This assessment should include the opportunities and limitations to maintaining and restoring biological integrity, diversity, and environmental health.

D. Consider the refuge's importance to refuge, ecosystem, national, and international landscape scales of biological integrity, diversity, and environmental health. Also, identify the refuge's roles and responsibilities within the Regional and System administrative levels.

E. Consider the relationships among refuge purpose(s) and biological integrity, diversity and environmental health, and resolve conflicts among them.

G. Through the comprehensive conservation planning process, interim management planning, or compatibility reviews, determine the appropriate management direction to maintain and, where appropriate, restore, biological integrity, diversity, and environmental health, while achieving refuge purpose(s).

H. Evaluate the effectiveness of our management by comparing results to desired outcomes. If the results of our management strategies are unsatisfactory, assess the causes of failure and adapt our strategies accordingly.

3.10 What Factors Do We Consider When Maintaining and Restoring Biological Integrity, Diversity, and Environmental Health?

We plan for the maintenance and restoration of biological integrity, diversity, and environmental health while considering all three in an integrated and holistic manner. The highest measure of biological integrity, diversity, and environmental health is viewed as those intact and self-sustaining habitats and wildlife populations that existed during historic conditions.

A. Biological Integrity

(1) We evaluate biological integrity by examining the extent to which biological composition, structure, and function has been altered from historic conditions. Biological composition refers to biological components such as genes, populations, species, and communities. Biological structure refers to the organization of biological components, such as gene frequencies, social structures of populations, food webs of species, and niche partitioning within communities. Biological function refers to the processes undergone by biological components, such as genetic recombination, population migration, the evolution of species, and community succession [see 602 FW 3.4 C (1)(e), Planning Area and Data Needs].

(2) Biological integrity lies along a continuum from a biological system extensively altered by significant human

impacts to the landscape to a completely natural system. No landscape retains absolute biological integrity, diversity, and environmental health. However, we strive to prevent the further loss of natural biological features and processes, i.e., biological integrity.

(3) Maintaining or restoring biological integrity is not the same as maximizing biological diversity. Maintaining biological integrity may entail managing for a single species or community at some refuges and combinations of species or communities at other refuges. For example, a refuge may contain critical habitats for an endangered species. Maintaining that habitat (and, therefore, that species), even though it may reduce biological diversity at the refuge scale, helps maintain biological integrity and diversity at the ecosystem or national landscape scale.

(4) In deciding which management activities to conduct to accomplish refuge purpose(s) while maintaining biological integrity, we start by considering how the ecosystem functioned under historic conditions. For example, we consider the natural frequency and timing of processes such as flooding, fires, and grazing. Where it is not appropriate to restore ecosystem function, our refuge management will mimic these natural processes including natural frequencies and timing to the extent this can be accomplished.

(5) We may find it necessary to modify the frequency and timing of natural processes at the refuge scale to fulfill refuge purpose(s) or to contribute to biological integrity at larger landscape scales. For example, under historic conditions, an area may have flooded only a few times per decade. Migratory birds dependent upon wetlands may have used the area in some years, and used other areas that flooded in other years. However, many wetlands have been converted to agriculture or other land uses, the remaining wetlands must produce more habitat, more consistently, to support wetland-dependent migratory birds. Therefore, to conserve these migratory bird populations at larger landscape scales, we may flood areas more frequently and for longer periods of time than they were flooded historically.

B. Biological Diversity

(1) We evaluate biological diversity at various taxonomic levels, including class, order, family, genus, species, subspecies, and—for purposes of Endangered Species Act implementation—distinct population segment. These evaluations of biological diversity begin with population surveys

and studies of flora and fauna. The System's focus is on native species and natural communities such as those found under historic conditions [see 602 FW 3.4 C (1)(e)]. The Natural Heritage Network databases for respective States should prove a valuable tool for this initial evaluation.

(2) We also evaluate biological diversity at various landscape scales, including refuge, ecosystem, national, and international. On refuges, we typically focus our evaluations of biological diversity at the refuge scale; however, these refuge evaluations can contribute to assessments at larger landscape scales.

(3) We strive to maintain populations of breeding individuals that are genetically viable and functional. We provide for the breeding, migrating, and wintering needs of migratory species. We also strive to maximize the size of habitat blocks and maintain connectivity between blocks of habitats, unless such connectivity causes adverse effects on wildlife or habitat (e.g., by facilitating the spread of invasive species).

(4) At the community level, the most reliable indicator of biological diversity is plant community composition. We use the National Vegetation Classification System to identify biological diversity at this level.

C. Environmental Health

(1) We evaluate environmental health by examining the extent to which environmental composition, structure, and function have been altered from historic conditions. Environmental composition refers to abiotic components such as air, water, and soils, all of which are generally interwoven with biotic components (e.g., decomposers live in soils). Environmental structure refers to the organization of abiotic components, such as atmospheric layering, aquifer structure, and topography.

Environmental function refers to the processes undergone by abiotic components, such as wind, tidal regimes, evaporation, and erosion. A diversity of abiotic composition, structure, and function tends to support a diversity of biological composition, structure, and function [see 602 FW 3.4 C (1)(e), Planning Area and Data Needs].

(2) We are especially concerned with environmental features as they affect all living organisms. For example, at the genetic level, we manage for environmental health by preventing chemical contamination of air, water, and soils that may interfere with reproductive physiology or stimulate high rates of mutation. Such

contamination includes carcinogens and other toxic substances that are released within or outside of refuges.

(3) At the population and community levels, we consider the habitat components of food, water, cover, and space. Food and water may become contaminated with chemicals that are not naturally present. Activities such as logging and mining or structures such as buildings and fences may modify security or thermal cover. Unnatural noise and light pollution may also compromise migration and reproduction patterns. Unnatural physical structures, including buildings, communication towers, reservoirs, and other infrastructure, may displace space or may be obstacles to wildlife migration. Refuge facility construction and maintenance projects necessary to accomplish refuge purpose(s) should be designed to minimize their impacts on the environmental health of the refuge.

3.11 How Do We Apply Our Management Strategies To Maintain and Restore Biological Integrity, Diversity, and Environmental Health?

A. We strive to manage in a holistic manner the combination of biological integrity, diversity, and environmental health. We balance all three by considering refuge purpose(s), System mission, and landscape scales. Considered independently, management strategies to maintain and restore biological integrity, diversity, and environmental health may conflict.

B. For example, physical structures and chemical applications are often necessary to maintain biological integrity and to fulfill refuge purpose(s). We may use dikes and water control structures to maintain and restore natural hydrological cycles, or use rotenone to eliminate invasive carp from a pond. These unnatural physical alterations and chemical applications would compromise environmental health if considered in isolation, but they may be appropriate management actions for maintaining biological integrity and accomplishing refuge purpose(s).

C. We may remove physical structures to promote endangered species recovery in some areas, or we may remove plants or animals to protect structures, depending upon refuge purpose(s). Unless we determine that a species was present in the area of a refuge under historic conditions, we will not introduce or maintain the presence of that species for the purpose of biological diversity. We may make exceptions where areas are essential for the conservation of a threatened or endangered species and suitable

habitats are not available elsewhere. In such cases, we strive to minimize unnatural effects and to restore or maintain natural processes and ecosystem components to the extent practicable without jeopardizing refuge purpose(s).

3.12 How Do We Incorporate Information From Historic Conditions Into Our Management Decisions?

A. Maintaining biological integrity, diversity, and environmental health require an ecological frame of reference. A frame of reference allows us to contrast current conditions of our resources with historic conditions. The reference guides us in two ways. It provides information on how the landscape looked prior to changes in land use that destroyed and fragmented habitats and resulted in diminished wildlife populations and the extirpation or extinction of species. It also allows us to examine how natural ecosystems function and maintain themselves. We use these conditions as a frame of reference in which to develop goals and objectives.

B. We use historical conditions as the frame of reference to identify composition, structure, and functional processes that naturally shaped ecosystems. We especially seek to identify keystone species, indicator species, and types of communities that occurred during the frame of reference. We also seek to ascertain basic information on natural ecosystem structure such as predator/prey relationships and distribution of plant communities. Finally, we seek to identify the scale and frequency of processes that accompanied these components and structures, such as fire regimes, flooding events, and plant community succession. Where appropriate and feasible, we also pursue biological integrity, diversity, and environmental health by eliminating unnatural biotic and abiotic features and processes not necessary to accomplish refuge purpose(s).

C. We do not expect, however, to reconstruct a complete inventory of components, structures, and functions for any successional stage occurring during the frame of reference. Rather, we use sound professional judgment to fit the pieces to create a conceptual picture of our resources under historic conditions.

D. We ensure that our management activities result in the establishment of a community that fits within what we reasonably believe to have been the natural successional series, unless doing so conflicts with accomplishing refuge purpose(s). We may choose to maintain

nonclimax communities pursuant to refuge purpose(s) or for maintaining biological integrity, diversity, and environmental health at the regional, national, or international landscape scale. We favor techniques such as fire or flooding that mimic or result in natural processes to maintain these nonclimax communities. However, where it will support fulfillment of refuge purpose(s), we allow or, if necessary, encourage natural succession to proceed.

3.13 Where Do We Get Information on Historic Conditions?

A. Information on historic conditions may be historical, archeological, or other. Historical information includes the written and, in some cases, the pictographic accounts of Native Americans, explorers, surveyors, traders, and early settlers. Archeological information comes from collections of cultural artifacts maintained by scientific institutions. We may obtain other data from a range of sources, including research, soil sediments, and tree rings.

B. We obtain information on historic conditions from our investigations and from partners in academia, conservation organizations, and other Federal, State, Tribal, and local government agencies. In many cases, we use historical vegetation maps to provide data. Such historical maps are usually drawn at relatively coarse scales, perhaps to the level of vegetation alliance. Generally a comprehensive historical list of plant and animal species is not available or necessary. We will base the determination of natural species and ecosystem composition on sound professional judgment. We periodically update our information on historic conditions with results from ongoing historical, archeological, and other studies.

3.14 How Do We Manage Populations To Maintain and Restore Biological Integrity, Diversity, and Environmental Health?

A. We encourage cooperation and coordination with State fish and wildlife management agencies in setting refuge population goals and objectives. To the extent practicable, our regulations pertaining to fishing or hunting of resident wildlife within the System are consistent with State fish and wildlife laws, regulations, and management plans.

B. We maintain, or contribute to the maintenance of, populations of native species. We design our wildlife population management strategies to support accomplishing refuge

purpose(s) while maintaining or restoring biological integrity, diversity, and environmental health. We formulate refuge goals and objectives for population management by considering natural densities, social structures, and population dynamics at the refuge level, and population objectives set by national plans and programs—such as the North American Waterfowl Management Plan—in which the System is a partner.

C. Natural densities are relatively stable for some species and variable for others. We manage populations for natural densities and levels of variation, while assuring that densities of endangered or otherwise rare species are sufficient for maintaining viable populations. We consider population parameters such as sex ratios and age class distributions when managing populations to maintain and restore where appropriate biological integrity, diversity, and environmental health.

D. On some refuges, including many of those having the purpose of migratory bird conservation, we establish goals and objectives to maintain densities higher than those that would naturally occur at the refuge level because of the loss of surrounding habitats. We more closely approximate natural levels at larger landscape scales, such as flyways, by maintaining higher densities at the refuge level.

E. We do not, however, allow densities to reach excessive levels that result in adverse effects on wildlife and habitat. The effects of producing densities that are too high may include disease, excessive nutrient accumulation, and the competitive exclusion of other species. We use planning and sound professional judgment to determine prudent limits to densities.

F. Where practical, we support the reintroduction of extirpated native species. We consider such reintroduction in the context of surrounding landscapes. We do not introduce species on refuges outside their historic range or introduce species if we determine that they were naturally extirpated, unless such introduction is essential for the survival of a species and prescribed in an endangered species recovery plan, or is essential for the control of an invasive species and prescribed in an integrated pest management plan.

3.15 How Do We Manage Habitats To Maintain and Restore Biological Integrity, Diversity, Environmental Health?

A. We will, first and foremost, maintain existing levels of biological

integrity, diversity, and environmental health at the refuge scale. Following that, we will restore lost or degraded elements of biological integrity, diversity, and environmental health at all landscape scales where it is feasible and supports fulfillment of refuge purposes.

B. Our habitat management plans call for the appropriate management strategies that mimic historic conditions while still accomplishing refuge objectives. For example, prescribed burning can simulate natural fire regimes or water level management can mimic natural hydrological cycles. Farming, haying, logging, livestock grazing, and other extractive activities are permissible habitat management practices only when prescribed in plans to meet wildlife or habitat management objectives, and only when more natural methods, such as fire or grazing by native herbivores, cannot meet refuge goals and objectives.

C. We do not allow refuge uses or management practices that result in the maintenance of non-native plant communities unless we determine there is no feasible alternative for accomplishing refuge purpose(s). For example, where we do not require farming to accomplish refuge purpose(s), we cease farming and strive to restore natural habitats. Where feasible and consistent with refuge purpose(s), we restore degraded or modified habitats in the pursuit of biological integrity, diversity, and environmental health. We use native seed sources in ecological restoration. We do not use genetically modified organisms in refuge management unless we determine their use is essential to accomplishing refuge purpose(s) and the Director approves the use.

3.16 How Do We Manage Non-Native Species To Maintain and Restore Biological Integrity, Diversity, and Environmental Health?

A. We prevent the introduction of invasive species, detect and control populations of invasive species, and provide for restoration of native species and habitat conditions in invaded ecosystems. We develop integrated pest management strategies that incorporate the most effective combination of mechanical, chemical, biological, and cultural controls while considering the effects on environmental health.

B. We require no action to reduce or eradicate self-sustaining populations of non-native, noninvasive species (e.g., pheasants) unless those species interfere with accomplishing refuge purpose(s). We do not, however, manage habitats to increase populations of these species

unless such habitat management supports accomplishing refuge purpose(s).

3.17 How Does This Policy Affect the Acquisition of Lands for the System?

A. We consider the mission, goals, and objectives of the System in planning for its strategic growth. We will take a proactive approach to identifying lands that are critical for maintaining or restoring the biological integrity, diversity, and environmental health of the System at all landscape scales. We will integrate this approach into all Service strategies and initiatives related to the strategic growth of the System. We incorporate the directives of this policy when evaluating an area's potential contribution to the conservation of the ecosystems of the United States.

B. We use the Land Acquisition Priority System to rank potential acquisitions once the Director approves significant expansions or new refuges. Our Land Acquisition Priority System includes components that gauge the contributions of refuges to maintaining and restoring biological integrity, diversity, and environmental health.

3.18 What Is the Relationship Between Biological Integrity, Diversity, and Environmental Health and Compatibility?

When completing compatibility determinations, refuge managers use sound professional judgment to determine if a refuge use will materially interfere with or detract from the fulfillment of the System mission or the refuge purpose(s). Inherent in fulfilling the System mission is protection of the biological integrity, diversity, and environmental health of the System. Specific policy for compatibility is found in 603 FW 2.

3.19 What Is the Relationship Between Biological Integrity, Diversity, and Environmental Health and Comprehensive Conservation Planning?

A. We integrate the principles of this policy into all aspects of comprehensive conservation planning, including pre-planning guidance [see 602 FW 3.4 C (1)(e)] as we complete plans to direct long-range refuge management and identify desired future conditions for proposed refuges (see 602 FW 1.7 D).

B. Refuge purpose(s) and the System mission serve as the basis for goals and objectives at all levels of the System (e.g., System, Regional, ecosystem, and refuge level). When we develop refuge goals and objectives during the Comprehensive Conservation Plan process we include goals and objectives

for maintaining and restoring the biological integrity, diversity, and environmental health of the refuge.

C. While developing Comprehensive Conservation Plans, we make management decisions based on sound professional judgment. We subsequently evaluate the effectiveness of these decisions by comparing results to desired outcomes. If the results are unsatisfactory, we assess the causes of failure and adapt our management decisions accordingly. In part, we base management decisions on natural resource-related research that has been conducted on refuges. This type of research adds to the general body of information related to natural resource management and aids us in continually adapting our management decisions. We generally encourage natural resource-related research on refuges.

3.20 How Do We Protect Biological Integrity, Diversity, and Environmental Health From Actions Outside of Refuges?

Events occurring off refuge lands or waters may injure or destroy the biological integrity, diversity, and environmental health of a refuge. Given their responsibility to the public resources with which they have been entrusted, refuge managers should address these problems. It is critical that they pursue resolution fully cognizant and respectful of legitimate private property rights, seeking a balance between such rights and the refuge manager's own responsibility to the public trust. While each situation will be different, the following is a suggested procedure which emphasizes our desire for cooperative resolutions. The time and effort expended, and the rate at which a refuge manager escalates the process, will depend on the severity of threat and the resources at risk.

A. We first seek resolution by directly contacting the landowner(s), corporation, agency or other entity from which the problem originates.

B. Where direct discussions fail, managers might seek resolution through collaborative discussions with State or local authorities or other organizations that can help in cooperative resolution of the problem.

C. An appropriate next step might be to pursue resolution at the local level through planning and zoning boards or other regulatory agencies at the city and county level. Failing that, the manager may seek avenues through State administrative and regulatory agencies. Regulatory solutions are a serious step, and a manager should take this route only after careful consideration and in

close consultation with the Regional Offices.

D. If the above efforts fail, we may take action within the legal authorities available to the Service and with full respect to private property rights. In

such cases, refuge managers will consult with the Office of the Solicitor for assistance in identifying appropriate remedies and obtain concurrence from the Regional Director.

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Jamie Rappaport Clark,

Director, U.S. Fish and Wildlife Service.

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