FWS Form
3-2319
02/06

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Edwin B. Forsythe National Wildlife Refuge

Use: Research Conducted by Non-Service Personnel

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	**YES**	**NO**
(a)Do we have jurisdiction over the use?	X	
(b)Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c)Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d)Is the use consistent with public safety?	X	
(e)Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f)Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g)Is the use manageable within available budget and staff?	X	
(h)Will this be manageable in the future within existing resources?	X	
(i)Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j)Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes_____ No __X__.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ____ **Appropriate _X___**

Refuge Manager: _____ Date: _____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Edwin B. Forsythe National Wildlife Refuge

Use: Research Conducted by Non-Service Personnel

Narrative:

Refuge staff at the Edwin B. Forsythe National Wildlife Refuge (Forsythe Refuge, the refuge) has evaluated all existing or requested non-priority public uses to determine if they are an appropriate use for the refuge. Research by non-U.S. Fish and Wildlife Service (Service) personnel on Forsythe Refuge is conducted by academic institutions, Federal, State, and local agencies, non-governmental organizations, and qualified members of the general public. Only research that is relevant, applicable, and useful to the refuge or the National Wildlife Refuge System (Refuge System) would be allowed. The primary purpose of this use is to further our basic understanding of the refuge's biological and cultural resources, and to inform our management decisions that affect those resources. In many cases, research by non-Service personnel ensures the perception of unbiased and objective information gathering, which can be important when using the research to develop management recommendations for politically sensitive issues. Additionally, universities and other Federal and State partners can often access equipment and facilities unavailable to refuge staff for analysis of data or biological samples.

The Service would encourage and prioritize research and management studies on refuge lands that would improve and strengthen natural resource management decisions. The refuge manager would particularly encourage research supporting approved refuge goals and objectives that clearly improves land management decisions related to Federal trust resources, helps evaluate or demonstrate state-of- the art techniques, and/or helps address or adapt refuge lands to climate and land use change impacts.

Refuge staff would also consider research for other purposes that may not be directly related to refuge-specific goals and objectives, but contribute to the broader enhancement, protection, use, preservation, and management of cultural resources and native populations of fish, wildlife, and plants, and their natural diversity within the Northeast Region or Atlantic Flyway. All research proposals must also comply with the Service's compatibility policy.

Evaluating and accepting or rejecting study proposals, as well as conditioning the special use permits (SUP) appropriately, would minimize the impacts of, and maximize the value of, such research. If a research project occurs during the refuge's hunting season, special precautions would be required and enforced to ensure the researchers' health and safety. If conducted according to refuge-specific stipulations set forth in an approved compatibility determination and in a project-specific SUP, this use would not affect the Service's ability to protect, conserve and manage wildlife and their habitats, nor would it impair existing wildlife-dependent recreational uses or reduce the potential to provide quality, compatible, wildlife-dependent recreation uses into the future.

Research, therefore, has been found appropriate because it is beneficial to the refuge's natural and cultural resources, is consistent with the goals and objectives of the refuge.

This finding of appropriateness and the compatibility determination for this use will be distributed for public comment for 14 days.

Draft COMPATIBILITY DETERMINATION

USE:

Research Conducted by Non-service Personnel

REFUGE NAME:

Edwin B. Forsythe National Wildlife Refuge

ESTABLISHNG AND ACQUISITION AUTHORITY(IES):

The Edwin B. Forsythe National Wildlife Refuge (Forsythe Refuge) was created on May 22, 1984 by combining the former Brigantine and Barnegat National Wildlife Refuges (98 Stat. 207). The Brigantine National Wildlife Refuge was established on January 24, 1939 by the Migratory Bird Conservation Commission, under the authority of the Migratory Bird Conservation Act (16 U.S.C. section 715d) to preserve estuarine habitats important to the Atlantic Brant (*Branta bernicla*) and to provide nesting habitats for black ducks (*Anas rubripes*) and rails (*Rallidae*). The Barnegat National Wildlife Refuge was established on June 21, 1967, under the authority of the Migratory Bird Conservation Act (16 U.S.C. section 715d) to preserve estuarine feeding and resting habitat for ducks and brant.

REFUGE PURPOSES:

For lands acquired under the Migratory Bird Conservation Act (16 U.S.C. section 715-715r) as amended, "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. section 715d)

For lands acquired under the Fish and Wildlife Act of 1956 (16 U.S.C. section 742(a)-754) as amended, "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." (16 U.S.C. section 742 (a) (4)) "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 U.S.C. section 742f (b) (1))

For lands acquired under the Emergency Wetlands Resources Act of 1986 (16 U.S.C. section 3901(b)) "...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." (16 U.S.C. section 3901(b), 100 Stat. 3583)

For lands designated as parts of the National Wilderness Preservation System under P. L. 93-632, "...to secure for the American people of the present and future generations the benefits of an enduring resource of wilderness." (78 Stat. 890, 16 U.S.C. 1121 (note), 1131-1136)

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)

DESCRIPTION OF ACTION:

a) What is the use? Is the use a priority public use? This determination covers low impact research projects; namely, those projects with methods that only have a minimal potential to adversely impact cultural resources and native wildlife and plants.

This is not an all-inclusive list, but examples of the types of research that would be allowed include: mist-netting for banding or tagging birds, point count surveys, fish and amphibian tagging, electrofishing, radio-telemetry tracking, use of cameras and recorders, use of live or other passive traps, or non-destructive searches of nests, dens, or burrows.

Research activities allowed under this determination would not result in long-term, negative alterations to species' behavior (e.g. result in wildlife leaving previously occupied areas for long periods; modifying their habitat use; or, causing nest or young abandonment). No project would degrade wildlife habitat, including vegetation, soils, and water. Research associated activities that would not be allowed include, but are not limited to, those that would result in soil compaction or erosion, degrade water quality, remove or destroy vegetation, involve off-road vehicle use, collect and remove animals or whole native plants, cause public health or safety concerns, or result in conflicts with other compatible refuge uses.

Refuge support of research directly related to refuge goals and objectives may take the form of funding, in-kind services such as housing or use of other facilities, vehicles, boats, or equipment, direct staff assistance with the project in the form of data collection, provision of historical records, conducting of management treatments, or other assistance as appropriate.

Research conducted by non-Service personnel is not a priority public use of the National Wildlife Refuge System (Refuge System) under the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee), and the Refuge System Improvement Act of 1997, as amended (Public Law 105-57).

b) Where would the use be conducted? The location of the research could be on all refuge areas, including lands acquired in the future, and will vary depending on the individual research project that is being conducted. The entire refuge may be made available for specific scientific research projects. However, an individual research project is usually limited to a particular habitat type, plant or wildlife species. On occasion research projects may encompass an assemblage of habitat types, plants or wildlife. The research location will be limited to only those areas of the refuge that are necessary to conduct any specific, approved research project. The methods and routes of access to study locations will be identified by refuge staff.

c) When would the use be conducted? The timing of the research will depend on the individual research project that is being conducted. Scientific research may be allowed to occur on the refuge throughout the year. An individual research project could be short-term in design, requiring one or two visits over the course of a few days. Other research projects could be multiple-year studies that require regular visits to the study site. The timing of each individual research project will be limited to the minimum required to complete the project. If a research project occurs during a refuge hunting season, special precautions or limitations may be required to ensure the safety of researchers or staff. The refuge manager would approve the timing (e.g., project length, seasonality, time of day) of the research prior to the start of the project to minimize impacts to wildlife and habitats, ensure safety, and reduce conflicts with other compatible refuge uses.

d) How would the use be conducted? The methods of a research project will depend on the individual project that is being conducted. The methods of each research project will be evaluated before it will be allowed to occur on the refuge.

Research projects must have a Service-approved study plan and protocol. A detailed research proposal that follows the refuge's study proposal guidelines (see Attachment 1) is required from parties interested in conducting research on the refuge. Each research proposal request will be considered, and if determined appropriate and compatible, will be issued an SUP by the refuge manager that includes the stipulations in this determination. The refuge manager will use sound professional judgment and ensure that the request will have no considerable negative impacts to natural or cultural resources, or impact visitors, and does not violate refuge regulations. Before initiating a research project that involves federally listed endangered or threatened species, an interagency Section 7 consultation under the Endangered Species Act of 1973, as amended would be completed. Any research involving ground disturbance may require historic preservation consultation with the Regional Historic Preservation Officer and/or State Historic Preservation Officer. Proposals intended to occur in the Brigantine National Wilderness Area may require wilderness review to ensure impacts to wilderness characteristics are avoided or minimized.

If approved, multi-year research projects will be reviewed annually to ensure that they are meeting their intended design purposes, that reporting and communicating with refuge staff is occurring, and that projects continue to be consistent with the mission of the Refuge System and purposes for which the refuge was established.

If the refuge manager decides to deny, modify, or halt a specific research project, the refuge manager will explain the rationale and conclusions supporting their decision in writing. The denial or modification to an existing study will generally be based on evidence that the details of a particular research project may:

- Negatively impact native fish, wildlife, and habitats or cultural, archaeological, or historical resources.
- Detract from fulfilling the refuge's purposes or conflict with refuge goals and objectives.
- Raise public health or safety concerns.
- Conflict with other compatible refuge uses.
- Not be manageable within the refuge's available staff or budget time.
- Deviate from the approved study proposal such that impacts to refuge resources are more severe or extensive than originally anticipate.

e) Why is this use being proposed? Quality, scientific research, including inventory and monitoring projects, are an integral part of refuge operations and management. Thorough research provides critical information for establishing baseline information on refuge resources and evaluating management effects on wildlife and habitat. Research results will help inform, strengthen, and improve future refuge management decisions, as well as inform management decisions on other ownerships with Federal trust resources near the refuge and possibly elsewhere in the Northeast Region. For example, past projects on the refuge have studied saltmarsh sparrow habitat requirements, diamondback terrapin use of the site, and American black duck winter ecology. Research projects may also include evaluating habitat management treatments and the associated wildlife community response, as well as, measures of impacts from public uses on refuge lands.

The refuge manager would particularly encourage research supporting approved refuge goals and objectives that clearly improves land management decisions related to Federal trust resources, helps evaluate or demonstrate state-of-the-art techniques, and/or helps address or adapt to climate and land use change impacts.

The refuge may also consider research for other purposes which may not be directly related to refuge-specific objectives, but would contribute to the broader enhancement, protection, use, preservation and

management of populations of fish, wildlife and plants, and their natural diversity within the region or flyway. These proposals must comply with the Service's compatibility policy.

AVAILABILITY OF RESOURCES:

The resources necessary to provide and administer this use are available within current and anticipated refuge budgets. The bulk of the cost for research is incurred in staff time to review research proposals, coordinate with researchers, and write SUPs. In some cases, a research project may only require 1 day of staff time to write a SUP. In other cases, a research project may take many weeks, as the refuge staff must coordinate with students and advisors and accompany researchers on site visits. These responsibilities are accounted for in budget and staffing plans.

We estimate below the annual costs associated with the administration of this use. We do not anticipate charging fees.

Review proposals, coordinate with researchers (Refuge biologist):	*$3,700*
Review proposals, issue SUPs, and general coordination (Refuge manager):	*$2,100*
Total Annual Cost of Program:	**$5,800**

ANTICIPATED IMPACTS OF THE USE:

The Service encourages quality research to further the understanding of natural resources. Research by non-Service personnel contributes to the availability of the best available scientific information to support refuge management decisions.

Disturbance to wildlife, vegetation, water, soils, or cultural resources could occur while researchers are accessing study sites on vehicles or by foot, or while they are engaged in their project. The presence of researchers could also indirectly disturb wildlife. Potential impacts include:

- Trampling, damage, and killing of vegetation from walking off-trail (Kuss 1986, Roovers et al. 2004, Hammitt and Cole 1998).
- Soil compaction, soil erosion, and changes in hydrology from hiking on and off-trail (Kuss 1986, Roovers et al. 2004).
- Disturbance to wildlife that causes shifts in habitat use, abandonment of habitat, increased energy demands on affected wildlife, changes in nesting and reproductive success, and singing behavior (Knight and Cole 1991, Miller et al. 1998, Shulz and Stock 1993, Gill et al. 1996, Arrese 1987, Gill et al. 2001).

Overall, we expect that these impacts would be negligible because of the low number of researchers and because, under this determination, only low impact projects would be allowed. As indicated under (a) above, low impact projects are those that would only minimally impact cultural resources or native wildlife and plants, and would not result in long-term, negative alterations to species' behavior, or their habitat, including vegetation, soils, and water. Research would only be conducted in approved locations and at approved times of day and times of season to minimize impacts to sensitive habitats and wildlife.

Animals may be temporarily disturbed during direct or remote observation, telemetry, capture (e.g., mist-netting), or banding. In very rare cases, direct injury or mortality could result as an unintended result of research activities. Mist-netting and banding, which are common research methods, can cause stress, especially when birds are captured, banded, and weighed. In very rare cases, birds have been injured or killed during mist-netting, or killed when predators reach the netted birds before researchers. In a study of mist-netting and banding at 22 bird banding stations in the U.S. and Canada, Spotswood et al. (2012) found that the average rate of injury was very low (0.59 percent; mostly from damage to the wings, stress, cuts, or breaks) and the average rate of mortality was also very low (0.23 percent; mostly from stress and predation). Overall, they found that the likelihood of injury differed among species (e.g., heavier birds were more prone to incidents) and some species were more vulnerable to certain types of injuries. To minimize the potential for injuries, researchers should be properly trained (Fair et al. 2010, Spotswood et al. 2012) and look for signs of stress (e.g., lethargy, panting, raising feathers, closing eyes), wing strain, tangling, and predation (Spotswood et al. 2012). Impacts can also be minimized by considering the species to be captured, mesh size of net, time of day, time of year, weather, the number of birds that need to be captured, and the level of predation (Fair et al. 2010).

Castelli and Trost (1996) found that hard plastic neck bands reduced survival of Canada geese. Barron et al. (2010) found that radio transmitters attached for research can also negatively impact bird species by affecting their behavior and ecology. The greatest impacts from transmitters were increased energy expenditure and decreased the likelihood of nesting. They also found that the method of transmitter attachment had an impact on the likelihood of injury or mortality, with anchored and implanted transmitters having the highest mortality due to the need for anesthesia. Collar and harness transmitters also had high mortality rates because they could cause birds to become entangled in vegetation. To minimize these risks, researchers can avoid anchored/implanted transmitters and use adjustable harnesses and collars with weak links that allow the device to detach if it becomes trapped in vegetation (Barron et al. 2010).

The U.S. Department of Agriculture's Animal Welfare Information Center maintains a website with resources to help minimize stress, injury, and mortality of wildlife in field studies at: https://awic.nal.usda.gov/research-animals/wildlife-*field-studies*. Recommendations relevant to refuge research projects would be followed. Included on this site are links to the following guidelines to help researchers limit their impacts on wildlife:

- The Ornithological Council's "Guideline to the Use of Wild Birds in Research" (Fair et al. 2010).
- The American Society of Mammologists, "Guidelines of the American Society of Mammologists for the Use of Wildlife Mammals in Research" (2011).
- American Fisheries Society, "Guidelines for the Use of Fishes Research" (2004).
- American Society of Ichthyologists and Herpetologists, "Guidelines for Use of Live Amphibians and Reptiles in Field Research" (2006).

Researchers may also inadvertently damage plants (e.g. via trampling or equipment use) during the research project. To minimize impacts, the SUP will outline how researchers are allowed to access their study sites and use equipment to minimize the potential for impacts to refuge vegetation, soils, and water.

Overall, allowing well-designed, properly reviewed, low impact research to be conducted by non-Service personnel is likely to have very little negative impact on refuge wildlife populations and habitats. We anticipate research will only have negligible to minor impacts to refuge wildlife and habitats because it will only be carried out after the refuge approves a detailed project proposal and issues a SUP including the stipulations in this determination to ensure compatibility. These stipulations are designed to help ensure each project minimizes impacts to refuge cultural resources, wildlife, vegetation, soils, and water. We also anticipate only minimal impacts because Service staff will supervise this activity, and it will be

conducted in accordance with refuge regulations. In the event of persistent disturbance to habitats or wildlife, the activity will be further restricted or discontinued. If the research project is conducted with professionalism and integrity, potential minor adverse impacts are likely to be outweighed by the body of knowledge contributed to our understanding of refuge resources and our management effects on those resources, as well as the opportunity to inform, strengthen, and improve future refuge management decisions.

PUBLIC REVIEW AND COMMENT:

This draft Compatibility Determination will be available for a 14-day public review and comment period. Notification will be posted at the refuge headquarters and visitor information center, on the refuge web site (http://www.fws.gov/northeast/forsythe), and the refuge Facebook page. Comments can be sent to the refuge at forsythe@fws.gov or PO Box 72, Oceanville, NJ 08231.

DETERMINATION (check one below):

_____ Action is Not Compatible

__X__ Action is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Only low impact projects are covered under this determination. Low impact projects, as indicated under (a) above, are those that would only have a minimal potential to impact cultural resources and native wildlife and plants. No project should result in long-term negative alterations to species' behavior (e.g. result in wildlife leaving previously occupied areas for a long term; modifying their habitat use within their range; or, causing nest or young abandonment). No project should degrade wildlife habitat, including vegetation, soils, and water. Nest, dens, and burrows must not be harmed. No research activities should result in soil compaction or erosion, degrade water quality, off-road vehicle use, or result in collection and removal of animals or whole native plants.

- All researchers will be required to submit a detailed research proposal following the refuge's study proposal guidelines (Attachment 1). The refuge must be given at least 45 days to review proposals before initiation of research. Proposals will include obligations for regular progress reports and a final summary document including all findings.

- The criteria for evaluating a research proposal, outlined in the "Description of Use" section (a) above, will be used when determining whether a proposed study will be approved on the refuge. Projects would be denied if they:

  - Negatively impact native fish, wildlife, and habitats or cultural, archaeological, or historical resources.

  - Detract from fulfilling the refuge's purposes or conflicts with refuge goals and objectives.

  - Cause public health or safety concerns.

  - Conflicts with other compatible refuge uses.

  - Are not manageable within the refuge's available staff or budget time.

- If proposal is approved, a SUP will be issued. The SUP will contain this determination's stipulations as well as project-specific terms and conditions that the researcher(s) must follow relative to the activities planned (e.g., location, duration, seasonality, etc.). Researchers must

have the SUP in their possession when engaged in research activities and will present it to refuge officials and State and Federal law enforcement agents upon their request.

- Researchers must comply with all State and Federal laws and follow all refuge rules and regulations. All necessary State and Federal permits must be obtained before starting research on the refuge (e.g., permits for capturing and banding birds). Any research involving federally listed species may require Section 7 consultation under the Endangered Species Act. Any research involving ground disturbance may require historic preservation consultation with the Regional Historic Preservation Officer and/or State Historic Preservation Officer.

- Researchers will mark any survey routes, plots, and points in as visually unobtrusive a manner as practical. No permanent markers or infrastructure can be left on the refuge.

- Researchers will use every precaution and not conduct activities that would cause damage to refuge property or present hazards or significant annoyances to other refuge visitors. Any damage should be reported immediately to the Refuge Manager.

- Researchers must not litter, or start or use open fires on refuge lands.

- All research staff handling wildlife must be properly trained to minimize the potential for impacts to individual wildlife prior to initiating the project. In addition, a review of the U.S. Department of Agriculture's Animal Welfare Information Center website must be documented by the researcher with identification of practices that will be followed to help further minimize stress, injury, and mortality of wildlife. The website is reached at: https://awic.nal.usda.gov/research-animals/wildlife-field-studies.

- Researchers may not use any chemicals (e.g., herbicides to treat invasive plants) or hazardous materials without prior written consent of refuge manager (e.g., the type of chemical, timing of use, and rate of application). All activities will be consistent with Service policy and an approved refuge Pesticide Use Plan.

- Researchers will be required to take steps to ensure that invasive species and pathogens are not inadvertently introduced or transferred to the refuge and surrounding lands (e.g., cleaning equipment).

- Refuge staff will monitor research activities for potential impacts to the refuge. The refuge manager may determine that previously approved research and SUP be modified or terminated due to observed impacts that are more severe or extensive than originally anticipated. The refuge manager will also have the ability to cancel a SUP if the researcher is not in compliance with the stated conditions.

- Researchers will submit a final report to the refuge within 6 months of completion of their work. For long-term studies, interim progress reports may also be required. The refuge also expects that research findings will be published in peer-reviewed publications. The contribution of the refuge and the Service should be acknowledged in any publications. The SUP will identify a schedule for annual progress reports and the submission of a final report or scientific paper.

- Research would only be conducted in Service-approved locations, using approved modes of access, and conducted only after the timing, season, duration, numbers of researchers, and areas open and closed is approved. Sensitive wildlife habitat areas will be avoided unless sufficient protection, approved by the Service, is implemented to limit the area and/or resources potentially impacted by the proposed research.

- If a research project occurs during the refuge hunting season, special precautions will be required and enforced to ensure public health and safety, and otherwise reduce conflicts with other compatible refuge uses.

- The researcher will be required to notify and coordinate with the appropriate County mosquito control commission to ensure they are not sprayed while conducting research on refuge lands.

- The Service will require modifications to research activities, including temporarily closing areas, or changing methods, when warranted, to avoid harm to sensitive wildlife and habitat when unforeseen impacts arise.

JUSTIFICATION:

The Service encourages quality, scientific research because it provides critical baseline information on Federal trust and other refuge resources and helps evaluate the management effects on those resources. Given the stipulations above, and given that only low impact research projects would be conducted under this determination, we do not anticipate this activity will have greater than minor to negligible impact on refuge resources. Impacts, if they occur, would be confined in area, duration, and magnitude, with no long-term consequences predicted. Therefore, research conducted by non-Service personnel on Forsythe Refuge will not materially interfere with or detract from the mission of the Refuge System or the purposes for which the refuge was established.

Signature - Refuge Manager: _____
(Signature and Date)

Concurrence - Regional Chief: _____
(Signature and Date)

Mandatory 10-year Reevaluation Date: _____

LITERATURE CITED:

Arrese, P. 1987. Age, intrusion pressure and defense against floaters by territorial male Song Sparrows. Animal Behavior 35:773-784.

Barron, D. G., J.D. Brawn, and P. J. Weatherhead. 2010. Meta-analysis of transmitter effectson avian behavior and ecology. Methods in Ecology and Evolution. 1:2. 180-187.

Castelli, P. M., and R. E. Trost. 1996. Neck bands reduce survival of Canada geese in New Jersey. Journal of Wildlife Management. 60:4. 891-898.

Fair, J., E. Paul, and J. Jones, Eds. 2010. Guidelines to the Use of Wild Birds in Research. Washington, D.C.: Ornithological Council.

Gill, J. A., K. Norris, and W.J. Sutherland. 2001. Why behavioural responses may not reflect the population consequences of human disturbance. Biological Conservation. 97:2. 265-268.

Gill, J. A.,W.J. Sutherland, and A.R. Watkinson. 1996. A method to quantify the effects of human disturbance on animal populations. Journal of Applied Ecology 33:786-792.

Hammitt, W.E., and D.N. Cole. 1998. Wildlife Recreation: Ecology and Management (2nd edition). New York: John Wiley & Sons. 361p.

Knight, R.L., and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the 56th North American Wildlife and Natural Resources Conference pp.238-247.

Kuss, F. R. 1986. A review of major factors influencing plant responses to recreation impacts. Environmental Management 10:5, 637–650.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8:162-169.

North American Banding Council. 2001. North American bander's manual. April 2001. Accessed May 2015 online at: http://www.nabanding.net/other-*publications/*.

Roovers, P, K. Verheyen, M. Hermy, and H. Gulinck. 2004. Experimental trampling and vegetation recovery in some forest and heathland communities. Applied Vegetation Science 7:1. 111-118.

Schultz, R.D., and M. Stock. 1993. Kentish plovers and tourist-competitors on sandy coasts? Wader Study Group Bulletin 68 (special issue): 83-92.

Spotswood, E.N., K.R. Goodman, J. Carlisle, R.L. Cormier, D.L. Humple, J. Rousseau, S.L. Guers, and G.G. Barton. 2012. How safe is mist netting? Evaluating the risk of injury and mortality to birds. Methods in Ecology and Evolution 3:29-38**.**

Attachment 1. Edwin B. Forsythe National Wildlife Refuge
Study Proposal Guidelines

A study proposal is a justification and description of the work to be done, and includes cost and time requirements. Proposals must be specific enough to serve as "blueprints" for the investigative efforts. Step-by-step plans for the actual investigations must be spelled out in advance, with the level of detail commensurate with the cost and scope of the project and the needs of management. Please submit proposals electronically as a Microsoft Word document.

The following list provides a general outline of first order headings/sections for study proposals.

- Cover Page
- Table of Contents (for longer proposals)
- Abstract
- Statement of Issue
- Literature Summary
- Objectives/Hypotheses
- Study Area
- Methods and Procedures
- Quality Assurance/Quality Control
- Specimen Collections
- Deliverables
- Special Requirements, Concerns, Necessary Permits
- Literature Cited
- Peer Review
- Budget
- Personnel and Qualifications

Cover Page

The cover page must contain the following information:

- Title of Proposal
- Current Date
- Investigator(s): name, title, organizational affiliation, address, telephone and fax numbers and e-mail address of all investigators or cooperators
- Proposed starting date
- Estimated completion date
- Total Funding or Other Support Requested from the U.S. Fish and Wildlife Service
- Signatures of Principal Investigator(s) and other appropriate institutional officials

Abstract

The abstract should contain a short summary description of the proposed study, including reference to major points in the Statement of Issue, Objectives, and Methods and Procedures sections.

Statement of Issue

Provide a clear, precise summary of the problem to be addressed and the need for its solution. This section should include statements of the importance, justification, relevance, timeliness, generality, and contribution of the study. Describe how any products will be used, including any anticipated commercial use. What is the estimated probability of success of accomplishing the objective(s) within the proposed timeframe?

Literature Summary

This section should include a thorough but concise literature review of current and past research that pertains to the proposed research, especially any pertinent research conducted within the Forsythe Refuge. A discussion of relevant legislation, policies, and refuge planning and management history, goals, and objectives should also be included.

Objectives/Hypotheses

A very specific indication of the proposed outcomes of the project should be stated as objectives or hypotheses to be tested. Project objectives should be measurable. Provide a brief summary of what information will be provided at the end of the study and how it will be used in relation to the problem. These statements should flow logically from the statement of issue and directly address the management problem.

Establish data quality objectives in terms of precision, accuracy, representativeness, completeness, and comparability as a means of describing how good the data need to be to meet the project's objectives.

Study Area

Provide a detailed description of the geographic area(s) to be studied and include a clear map delineating the proposed study area(s) and showing specific locations where work will occur.

Methods and Procedures

This section should describe as precisely as possible how the objectives will be met or how the hypotheses will be tested. Include detailed descriptions and justifications of the field and laboratory methodology, protocols, and instrumentation. Explain how each variable to be measured directly addresses the research objective/hypothesis. Describe the experimental design, population, sample size, and sampling approach (including procedures for sub-sampling). Summarize the statistical and other data analysis procedures to be used. List the response variables and tentative independent variables or covariates. Describe the experimental unit(s) for statistical analysis. Also include a detailed project time schedule that includes initiation, fieldwork, analysis, reporting, and completion dates.

Quality Assurance/Quality Control

Adequate quality assurance/quality control (QA/QC) procedures help ensure that data and results are: credible and not an artifact of sampling or recording errors; of known quality; able to stand up to external scientific scrutiny; and accompanied by detailed method documentation. Describe the procedures to be used to ensure that data meet defined standards of quality and program requirements, errors are controlled in the field, laboratory, and office, and data are properly handled, documented, and archived. Describe the various steps (e.g., personnel training, calibration of equipment, data verification and validation) that will be used to identify and eliminate errors introduced during data collection (including observer bias), handling, and computer entry. Identify the percentage of data that will be checked at each step.

Specimen Collections

Clearly describe the kind (species), numbers, sizes, and locations of animals, plants, rocks, minerals, or other natural objects to be sampled, captured, or collected. Identify the reasons for collecting, the intended use of all the specimens to be collected, and the proposed disposition of collected specimens. For those specimens to be permanently retained as voucher specimens, identify the parties responsible for cataloging, preservation, and storage and the proposed repository.

Deliverables

The proposal must indicate the number and specific format of hard and/or electronic media copies to be submitted for each deliverable. The number and format will reflect the needs of the refuge and the Refuge manager. Indicate how many months after the project is initiated (or the actual anticipated date) that each deliverable will be submitted.

Deliverables required are as follows:

Reports and Publications

Describe what reports will be prepared and the timing of reports. Types of reports required in fulfillment of natural and social science study contracts or agreements include:

(1) Progress report(s) (usually quarterly, semiannually, or annually): may be required
(2) Draft final and final report(s): always required

A final report must be submitted in addition to a thesis or dissertation (if applicable) and all other identified deliverables. Final and draft final reports should follow refuge guidelines (Attachment 1a).

In addition, investigators are encouraged to publish the findings of their investigations in refereed professional, scientific publications and present findings at conferences and symposia. Refuge staff must review data analyses, results and conclusions prior to publication.

Data Files

Provide descriptions of any spatial (Geographic Information Systems; GIS) and non-spatial data files that will be generated and submitted as part of the research. Non-spatial data must be entered onto Windows CD ROMs in Access or Excel. Spatial data, which includes GPS (Global Position System)-generated files, must be in a format compatible with the refuge's GIS system. All GIS data must be in 18N, NAD 83.

Metadata

For all non-spatial and spatial data sets or information products, documentation of information (metadata) describing the extent of data coverage and scale, the history of where, when, and why the data were collected, who collected the data, the methods used to collect, process, or modify/ transform the data, and a complete data dictionary must also be provided as final deliverables. Spatial metadata must conform to U.S. Fish and Wildlife Service (Federal Geographic Data Committee; FDGC) metadata standards.

Oral Presentations

If requested by the refuge, up to three oral briefings may be required: pre-study, annual, and closeout.

These briefings will be presented to refuge staff and other appropriate individuals and cooperators. In addition, investigators should conduct periodic informal briefings with refuge staff throughout the study whenever an opportunity arises. During each refuge visit, researchers should provide verbal updates on project progress. Frequent dialogue between researchers and refuge staff is an essential element of a successful research project.

Specimens and Associated Project Documentation

A report on collection activities, specimen disposition, and the data derived from collections, must be submitted to the refuge following refuge guidelines.

Additional deliverables may be required of specific studies.

Special Requirements, Permits, and Concerns

Provide information on the following topics where applicable. Attach copies of any supporting documentation that will facilitate processing of your application.

Refuge Assistance

Describe any refuge assistance needed to complete the proposed study, such as use of equipment or facilities or assistance from refuge staff. Refuge staff may not be able to provide assistance if time does not allow coordination of this activity.

Ground Disturbance

Describe the type, location, area, depth, number, and distribution of expected ground-disturbing activities, such as soil pits, cores, or stakes. Describe plans for site restoration of significantly affected areas.

Proposals that entail ground disturbance may require an archeological survey and special clearance prior to approval of the study.

Site Marking and/or Animal Marking

Identify the type, amount, color, size, and placement of any flagging, tags, or other markers needed for site or individual resource (e.g., trees) identification and location. Identify the length of time it is needed and who will be responsible for removing it. Identify the type, color, placement of any tags placed on animals (see SUP for requirements on marking and handling of animals).

Access to Study Sites

Describe the proposed method and frequency of travel to and within the study site(s). Explain any need to enter restricted or closed areas. Describe duration, location, and number of participants, and approximate dates of site visits.

Use of Mechanized and Other Equipment

Describe any vehicles, boats, field equipment, markers, or supply caches by type, number, and location. You should explain the need to use these materials and if or how long they are to be left in the field.

Safety

Describe any known potentially hazardous activities, such as electro-fishing, scuba diving, boating, aircraft use, wilderness travel, wildlife capture or handling, wildlife or immobilization.

Chemical Use

Identify chemicals and hazardous materials that you propose using within the refuge.

Indicate the purpose, method of application, and amount to be used. Describe plans for storage, transfer, and disposal of these materials and describe steps to remediate accidental releases into the environment. Attach copies of Material Safety Data Sheets.

Animal Welfare

If the study involves vertebrate animals, describe your protocol for any capture, holding, marking, tagging, tissue sampling, or other handling of these animals (including the training and qualifications of personnel relevant to animal handling and care). If your institutional animal welfare committee has reviewed your proposal, please include a photocopy of their recommendations. Describe alternatives considered, and outline procedures to be used to alleviate pain or distress. Include contingency plans to be implemented in the event of accidental injury to or death of the animal. Include state and Federal permits. Where appropriate, coordinate with and inform state natural resource agencies.

Literature Cited

List all reports and publications cited in the proposal.

Personnel and Qualifications

List the personnel who will work on the project and indicate their qualifications, experience, and pertinent publications. Identify the responsibilities of each individual and the amount of time each will devote. A full vita or resume for each principal investigator and any consultants should be included here.

Attachment 1a. Interim Final Report Guidelines

Draft and final reports should follow Journal of Wildlife Management format and should include the following sections:

Title Page
Abstract
Introduction/Problem statement
Study Area
Methods (including statistical analyses)
Results
Discussion
Management Implications
Management Recommendations
Literature Cited