UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	
THE DETROIT EDISON COMPANY	)	Docket No. 52-033-COL
	)	
(Fermi Nuclear Power Plant, Unit 3)	)	

AFFIDAVIT OF DAVID MIFSUD IN
SUPPORT OF SUMMARY DISPOSITION OF CONTENTION 8

I, David Mifsud, do hereby state as follows:

1. I am the owner of Herpetological Resource and Management ("HRM") in Michigan and a certified professional wetland scientist professional ecologist. I have worked for over fifteen years in wildlife biology, wetland ecology, and habitat conservation and management, with an emphasis on herpetofauna (reptiles) in Michigan. I have overseen and designed numerous projects and studies focused on the inventory, monitoring, conservation and management, rescue and translocation, and headstarting of amphibians and reptiles in Michigan for a variety of partners including non-profit, private, and governmental agencies. My research has focused on rare Michigan species, including the Eastern Fox Snake ("fox snake"). My work has included radio telemetry, mark-recapture, genetic, headstart, translocation, and repatriation studies. A statement of my professional qualifications is attached.

2. I assisted in the development of The Detroit Edison Company's ("Detroit Edison") *Habitat and Species Conservation Plan: Eastern Fox Snake (Elaphe gloydi)* ("Mitigation Plan") for construction activities. The plan describes measures to enhance employee awareness of the fox snake and to reduce impacts to fox snakes and their habitat from Fermi 3 construction activities. In particular, I helped to design the training program, the habitat

restoration and enhancement program, and the sampling, long-term monitoring, and collection programs. I also provided input to and have reviewed the motion for summary disposition and I affirm its accuracy.

3. In my professional opinion, the Mitigation Plan is a comprehensive and effective plan for mitigating potential impacts to fox snakes from Fermi 3 construction activities. The Mitigation Plan utilizes proven techniques and technology to collect as many fox snakes as possible from impacted areas and ensure their survival once they are relocated to unimpacted areas. The targeted collection and relocations of fox snakes will include visual encounter surveys, cover object surveys, barrier fence surveys, mark-recapture, and radio telemetry. The Mitigation Plan calls for an annual monitoring report during construction and for five years after site preparation is complete.

4. Under the Mitigation Plan, prior to beginning daily work on a developed or already disturbed area, designated employees will walk down the Fermi 3 site and observe for fox snakes. In addition, roadways used for construction related vehicles will also be walked down on a daily basis when the snakes are most likely to be present on or along roadways. Any fox snakes located in these areas will be removed by a designated Detroit Edison employee who will then relocate the snakes to undeveloped areas of the site which will not be impacted by Fermi 3 construction.

5. One week and again one day prior to clearing undeveloped areas, the areas will be walked through by a team led by a biologist familiar with eastern fox snakes and their habitat. Land clearing activities will be scheduled outside of the fox snake's hibernation periods so that they are active and easier to locate and safely remove from the area. During this walkthrough, any fox snakes observed will be captured and relocated to an undeveloped location on site which

will not be impacted by Fermi 3 construction activities. The lead biologist will ensure that the fox snakes are not harmed while being captured, transported or released. Potential hiding places for fox snakes will be uncovered and searched. Construction workers will continue to observe for fox snakes as clearing progresses. If a construction worker observes a fox snake during work activities, they are to stop work until the fox snake clears the area or until designated personnel can clear it from the area.

6. Detroit Edison will remove fox snakes during pre-construction and construction activities up to a 90% targeted collection goal, with continuing opportunistic collection. Collected fox snakes will be relocated to an on-site "safe zone" or, once complete, to the off-site mitigation site. Temporary snake barrier fences around the "safe zone" and mitigation site will prevent collected fox snakes from moving into active construction areas and will help snakes acclimate to the mitigation site. These efforts will significantly reduce potential impacts to the fox snake. All captured fox snakes will be marked with a Passive Integrated Transponder ("PIT") tag (some snakes will also be fitted with radio transmitters) for future identification and detection and monitored during the site preparation and post site preparation phases.

7. As fox snakes are a mobile species, there is the potential for snakes being killed by construction-related vehicles. The measures identified above (*e.g.*, collection and translocation, temporary barrier fences) will provide a substantial degree of protection for fox snakes which migrate to active roadways. Employees will be aware of the presence of fox snakes and reminded of their protected status on a daily basis at pre-job briefs. Roadways will be walked down daily in order to ensure that snakes are not present or, if present, removed from the path of danger. Vehicle drivers will be required to stop their vehicles in order to prevent fox snakes from being struck. To further create awareness about the danger posed to fox snakes

from vehicles, road signs indicating that fox snakes are present and must be yielded to will be installed along construction related roadways. And, construction related vehicles will be held to a speed limit of 15 mph while within the construction area. This low rate of speed will allow for fox snakes to be identified on or along roadways by vehicle drivers prior to being struck.

8. Hibernacula, basking structures, foraging grounds, shelter, snags, and nesting sites will be created as part of the habitat restoration plan. As described in Appendix C of the Mitigation Plan, approximately 20 acres of temporarily impacted wetlands at the Fermi site will be restored to fox snake habitat after construction. Invasive shrubs and herbaceous vegetation in targeted "safe zones" will be controlled to improve habitat quality and functionality for the fox snake and other species. Off-site and in the coastal zone of western Lake Erie, wetlands will be restored and existing wetlands will be enhanced. Restoration will include multiple community types used by the fox snake. Overall habitat availability and quality for the fox snake will be greater after restoration and enhancement efforts than at present. As a result of the net gain in available habitat and improvements in available habitat, the fox snake will not be extirpated from the area, but rather will have an opportunity to expand its range.

9. After the site preparation construction phase is complete and the bulk of fox snakes are relocated outside of the construction zone, monitoring will be conducted to assess fox snake movement, habitat use (including created hibernacula), and population health. Monitoring will be conducted at on-site locations, where fox snakes were relocated to, and at the off-site mitigation area. Monitoring will include use of visual encounter surveys, cover objects, mark-recapture (including PIT tag and radio telemetry), and barrier fence surveys. Fox snakes that may wander back near construction zones will be relocated outside of construction areas to safe areas. Monitoring will occur three to five days per week when fox snakes are active and monthly

during winter inactivity. Monitoring will be conducted during the entire site preparation construction phase.

10. Sampling will be conducted once site preparation work is complete and for a minimum of five years after completion of the site preparation construction phase. Sampling protocols will target and address key biological, ecological, and natural history requirements of fox snakes. Sampling will be conducted year round to also evaluate the efficacy and use of fox snake hibernacula.

11. The Mitigation Plan includes an annual monitoring report during construction and for five years after site preparation is complete. Metrics of success will be gauged through the accomplishment of "*Measures of Habitat Restoration, Enhancement, and Mitigation Success"* found in Appendix C of the Mitigation Plan. If problems or deficiencies in the various restoration plans are identified, corrective actions will be taken to fix or address these situations.

12. Overall, Detroit Edison has committed to a very significant mitigation effort. I believe these efforts will greatly minimize impacts to the fox snake and, in the long-term, will actually expand its habitat in the area. The monitoring and reporting efforts should also provide valuable information to guide conservation plans developed for other sites in the future.

13. I hereby certify under penalty of perjury that the foregoing is true and complete to the best of my knowledge, information, and belief.

Executed in accord with 10 C.F.R. § 2.304(d),

/s/ David Mifsud
David Mifsud
Herpetological Resource and Management
5301 Updyke Road
Grass Lake, Michigan 49240

Dated at Detroit, Michigan
this 11th of June 2012

David A. Mifsud

Herpetologist/Wetland Ecologist

Statement of Professional Qualifications

BIOGRAPHY

David A. Mifsud, is a Certified Professional Wetland Scientist through the Society of Wetland Scientists and a Certified Professional Ecologist through the Ecological Society of America. He is the owner and founder of Herpetological Resource and Management (HRM). He has been working for over fifteen years in wildlife biology, wetland ecology, and habitat conservation and management. Mifsud has developed Michigan's first salamander monitoring program and has coordinated Frog and Toad surveys for over a decade. Mifsud is very active within the herpetological community and is the Michigan Herpetological Atlas Administrator as well as a member of the State of Michigan Amphibian and Reptile Technical Advisory Board, Chair of Partners in Amphibian and Reptile Conservation (PARC) Michigan Chapter and Board member of the Midwest Chapter of PARC. He is an associate reviewer for the Society for the Study of Amphibians and Reptiles and serves as an expert on Great Lakes Turtles for the International Union for Conservation of Nature (IUCN) Tortoise and Freshwater Turtle Specialist Group. David has overseen and designed numerous projects for a variety of partners including non-profit, private, and governmental agencies, focused on the inventory, monitoring, and conservation of amphibians and reptiles in the Great Lakes Region.

EDUCATION

- **M.S.** Environmental Science, 2004, University of Michigan, Michigan.
- **B.S.** Biology, 1999, Aquinas College Grand Rapids, Michigan
- **B.S.** Geography , 1999, Aquinas College Grand Rapids, Michigan
- **B.S.** Environmental Studies, 1999, Aquinas College Grand Rapids, Michigan

CERTIFICATIONS

- Certified Professional Wetland Scientist #1510, Society of Wetland Scientists
- Certified Ecologist, The Ecological Society of America
- U.S. Army Corp of Engineers Wetland Delineation & Management Training Program
- Prescribed Burn Training, City of Ann Arbor Natural Area Preservation
- Red Cross First Aid/CPR certification
- Michigan Department of Natural Resources Research Scientific Collectors Permit
- Michigan Department of Natural Resources Threatened and Endangered Species Permit

PROFESSIONAL AFFILIATIONS

- State of Michigan Department of Natural Resources and Environment Amphibian and Reptile Technical Advisory Committee – *Board Member*

- Partners in Amphibian and Reptile Conservation Michigan Chapter – *Co-Founder and Co-Chair*
- Partners in Amphibian and Reptile Conservation Midwest Chapter – *Advisory Board Member*
- Partners in Amphibian and Reptile Conservation Midwest Chapter – *Task Force Chair: Impact of Fire on Herpetofauna*
- Society for the Study of Amphibians and Reptiles – *Associate Reviewer*
- Chelonian Research Foundation - *Member*
- Turtle Survival Alliance - *Member*
- Society of Wetland Scientists - *North Central Chapter Board Member and Associate Reviewer*
- Michigan Wetland Association - *Board Member*
- Society of State Wetland Managers - *Member*
- Rouge River Remedial Action Council – Board Member (*Aquatic Ecologist*)
- Stewardship Network - Huron and Lake Plain Prairie Clusters
- Huron River Watershed Council- Portage Creek Watershed Advisory Board

PUBLICATIONS

Best Development/Best Management Guidelines for Amphibians and Reptiles in Michigan. *Michigan Department of Environmental Quality*. David A. Mifsud. In Prep

Michigan Unisexual. 2010. *Herpetologica*. Jim Bogart, David A. Mifsud, Kelsey Pressler. In Prep

Laterale-Jerffersonianum-Jeffersonianum Unisexual Hybrid Reproduction in Michigan. *Herpetological Conservation and Biology*. David A. Mifsud and Sean Zera. In Prep

New County Observation for Laterale-Jerffersonianum-Jeffersonianum Unisexual Hybrid. *Herp Review*, David A. Mifsud. In Prep

Translocation and Repatriation of the Vernal Pool Dependant Wood Frog. *Herpetological Conservation and Biology*. David A. Mifsud. In Prep

Design and Project Results of an Amphibian and Reptile Rescue and Translocation. *Herpetological Conservation and Biology*. David A. Mifsud. In Prep

Habitat Alteration and Breeding Site Fidelity in *Amystoma maculatum*. *Herp Review*, David A. Mifsud. In Prep

Effectiveness of Barrier Fence in Reducing Mortality Migration Attempts of Amphibians to a Destroyed Wetland. *Herpetological Conservation and Biology*. David A. Mifsud. In Prep

Herpetofaunal And Plant Diversity in the Urban Rouge River Ecosystem. 2009. *Urban Ecosystems*. David A. Mifsud and John C. Thomas. Submitted.

Golf Courses as Refugia for Herpetofauna within an Urbanized Watershed. 2005. Society for the Study of Amphibians and Reptiles (SSAR) Herpetological Conservation Series, Volume III: Urban Herpetology. David A. Mifsud and Rachel Osborn. 2008

Land Use, Physical Factors, and Herpetological Distribution Within the Rouge River Watershed. 2004. M.S. Thesis, University of Michigan-Dearborn, Dearborn, Michigan. David A. Mifsud.

Turtles and Amphibians of Southeast Michigan: A Look at Habitat Needs, Management, and Conservation. 1999. Prepared for Michigan Department of Natural Resources. David A. Mifsud and Kevin J. Arnold.

PROFESSIONAL PRESENTATIONS

Amphibian & Reptile Transplantation: An Emerging Conservation Tool Poster: The Science Practice and Art of Restoring Native Ecosystems, Stewardship Network Conference. January 2010, Lansing, MI.

Fire and Herps: The Burning Question Invited Speaker: The Science Practice and Art of Restoring Native Ecosystems, Stewardship Network Conference. January 2010, Lansing, MI.

The Importance of Private Sector Collaborations in Conservation and Management of Herpetofauna: In: Proceedings from Partners in Amphibian and Reptile Conservation (PARC) Midwest Chapter Meeting - Collaboration: Identifying Hurdles and Overcoming Them. August 2009, Brighton, MI.

Creating and Maintaining Amphibian and Reptile Habitat in the Landscape Invited Speaker: The Science Practice and Art of Restoring Native Ecosystems, Stewardship Network Conference. January 2009, Lansing, MI.

Conservation Through Compromise: Coexistence of Herps and Prescribed Fire: In Proceed from: Fire, Herps, and Habitat Restoration. September 2008, Fort Custer Training Center, Augusta, MI.

A Multispecies Translocation Effort: Methods for Success In: Proceedings from Partners in Amphibian and Reptile Conservation (PARC) Midwest Chapter Meeting. September 2008, Bluegrass, IA

Rescue and Translocation of Amphibians and Reptiles: An Approach to Conservation Invited Speaker: The Science Practice and Art of Restoring Native Ecosystems, Stewardship Network Conference. January 2008, Lansing, MI.

Herpetological Management Guidelines for Southern Michigan Invited speaker: Michigan Department of Environmental Land and Water Division. September 2007, Jackson, MI.

Decreasing Turtle Nest Mortality: An Approach to Predator Exclusion In: Proceedings from Partners in Amphibian and Reptile Conservation (PARC) Midwest Chapter Meeting. August 2007, Indiana Dunes National Park, IN.

Applications of Landscape Level GIS Habitat Mapping to Aid in Delisting Criteria for AOC's In: Michigan Statewide Public Advisory Council Fall Work Session: Getting the Job Done (Invited Speaker). November 2006, Dearborn, MI.

Landscape Level GIS Mapping to Assess Habitat Availability in an Urban Watershed In: Proceedings from International Symposium: Wetlands 2006. August 2006, Traverse City, MI.

Herpetofaunal Use of Golf Courses as Refugia in an Urban landscape In: Proceedings from the Joint Meeting of Ichthyologist and Herpetologist (Invited Speaker). July 2006, New Orleans, LA.

Conducting an Intensive Amphibian and Reptile Rescue: A Case Study for Herpetological Conservation. In: Proceedings from the 66th Annual Midwest Fish and Wildlife Conference. December 2005, Grand Rapids, MI.

Habitat Use of Blanding's Turtle (Emydoidea blandingii) Within an Urban Ecosystem. In: Proceedings from the International Society of Wetland Scientists 26th Anniversary Conference. June 2005, Charleston, SC.

The Effects of Land Use Practices on the Reptile and Amphibian Inhabitants of the Rouge River Watershed, Michigan. In: Proceedings from the Michigan Academy of Science Arts & Letters. March 2005, Ypsilanti MI

Land Use, Physical Factors, and Herpetofaunal Distribution Within the Rouge River Watershed, Michigan, USA. In: Proceedings from the International Society of Wetland Scientists 25th Anniversary Conference. July 2004, Seattle WA.

Effective Management Strategies to Limit Fragmentation of Wildlife Habitat and Corridors: A Municipal Approach to Wetland Conservation. Proceedings from the International Society of Wetland Scientist Conference. May 2002, Chicago IL.

The Natural History, Management, and Conservation Needs of Reptile and Amphibians in S.E. Michigan. Presented to the Michigan Department of Natural Resources Fisheries and Wildlife Divisions and the Michigan Department of Environmental Quality. February 2000, Livonia, MI.

PROFESSIONAL EXPERIENCE

Herpetological Atlas Administrator – Conducted statewide reptile and amphibian surveys and manage database on behalf of State of Michigan for all reptiles and amphibians. Developed an online databse submittal system and conduct training and outreach to gain participation in project.

Herpetological Assessment Waterloo-Pinckney Recreation Area, Jackson, Washtenaw, and Livingston Counties, Michigan- Managed and conducted multiyear comprehensive amphibian and reptile assessment within the Waterloo and Pinckney Recreation Areas. Data was used to assess diversity, species distribution of rare species.

Pipeline Corridor Herpetological Assessment and Rare Species Rescue, Oakland County, Michigan- Conducted herpetological assessment along 16 mile proposed pipeline corridor for presence, diversity, abundance, and distribution of rare reptiles and amphibians. Worked with client to relocate rare species (as well as common) out of construction zone. Assisted in restoration plan development and returned rare species that were held during construction phase of project.

Eastern Fox Snake Telemetry Study, Monroe County Michigan – Conducted intensive field study on the State Threatened Snake species tracking movement and habitat selection using radio telemetry and GPS/GIS. Provided management and conservation recommendations.

Copperbelly Watersnake Study, South-Central Michigan, Northeastern Ohio and Northwestern Indiana- Conducted meander surveys for Federally threatened snakes in emergent and inundated scrub shrub wetlands. Collected GPS data points and habitat and associated species data for all encounters. Captured snakes to collect biological data and implant PIT tags for mark-recapture surveys.

Spotted Turtle Inventory and Habitat Corridor Design, Rochester Hills, Michigan – Conducted intensive survey for this State Threatened turtle and designed wildlife culvert system to allow safe passage for turtles potentially using project site post construction.

Butler's Garter Snake Genetic Study, Michigan, Ohio and Indiana – Project lead in multiple states working with Wisconsin Department of Natural Resources and private partners to collect tissue samples to assist in identification of State Endangered Butler's Garter Snake genetics in Wisconsin.

Detroit River International Wildlife Refuge Herpetological Inventory, Wayne and Monroe Counties Michigan – Conducted intensive reptile and amphibian species diversity and distribution inventory with emphasis on rare species and GPS/GIS mapping in Wayne and Monroe Counties. In addition to species observations, management and conservation recommendations were provided.

Eastern Box Turtle Long-term Study, Berrien County, Michigan- Assisting with long-term study looking at population viability, size, age class distribution, and threats along formally proposed road corridor in western Michigan. Provide management recommendations to land managers.

Rare Herpetofaunal Survey Oakwoods Metro Park, Wayne County, Michigan - Conducted surveys within Oakwoods Metro Park to assess the presence of rare amphibian and reptile species utilizing a variety of sampling and survey techniques to determine species presence. Identified species were GPSed and GIS maps were created showing species distribution, potential homerange, and existing and potential corridors.

Small-mouthed Salamander Assessment, Scio Twp, Michigan – Assessed parklands for presence of State Endangered salamander. Collected tissue samples to assess genetics, recorded observations of observed specimens, and provided report summarizing finding and recommendations.

Blanchard's Cricket Frog Translocation, Ypsilanti, MI- Assisted with collection and translocation of over 1,000 State Threatened Blanchard's Cricket Frogs from a wetland slated for development using meander searches and dip nets. Captured frogs were relocated to mitigation sites and to sites where the species occurred historically. Relocated populations were monitored to determine success of the translocation effort.

Lake Erie Metropark Rare Herpetofauna Assessment, Monroe County, Michigan – Conducted surveys to assess the presence of rare amphibian and reptile species with emphasis on Eastern Fox Snakes and other rare species. Identified species were GPSed and GIS maps were created showing species distribution, potential homerange, and existing and potential corridors. Report and recommendations were provide summarizing our findings.

Hudson Mills Metropark Rare Herpetofauna Assessment, Washtenaw County, Michigan - Designed and coordinated intensive survey to determine the presence, diversity, abundance, and distribution of rare reptiles and amphibians. Emphasis was placed on rare species including Massasauga Rattle Snake as part of a proposed bike trail project.

Eastern Fox Snake Inventory and Habitat Creation, Wayne County, Michigan- Inventoried property for private client to determine presence of State Threatened snake species. Developed management recommendations and restoration plan for snake and other herpetofauna post construction.

Herpetological Inventory and Habitat Design, University of Michigan, Ann Arbor, Michigan – Conducted inventory and habitat design for amphibians and reptile as part of University project. Also conducted monitoring of restored habitat and species use.

Brill's Lake Herpetological Inventory, Jackson County Michigan – Conducted intensive reptile and amphibian species diversity and distribution inventory and GPS/GIS mapping focusing on rare species. In addition to species observations, management and conservation recommendations were provided.

Sterling State Park Herpetological Inventory, Monroe Michigan – Conducted intensive reptile and amphibian species diversity and distribution inventory and GPS/GIS mapping. Provided management and conservation recommendations.

Rare Herpetofauna Survey, Liberty, Michigan – Designed and coordinated intensive survey to determine the presence, diversity, abundance, and distribution of rare reptiles and amphibians in a high quality fen as part of a habitat assessment effort for The Nature Conservancy. Emphasis was placed on Eastern Massasauga Rattlesnake and Eastern Box Turtles to determine potential impacts from ecological burns.

Blanding's Turtle Telemetry Study, Saginaw, Michigan – Conducted inventory and tracking via radio telemetry to determine potential nesting sites for future restoration and management. Developed detailed GIS maps showing species distribution and homerange within the Shiawassee National Wildlife Refuge.

Blanding's Turtle Study, Rouge River Watershed Michigan – Conducted intensive field study on the State Species of Special Concern turtle to determine distribution, density, sex ratio, age classes, nesting sites and habitat utilization using GPS/GIS in an urban ecosystem. The goal was to identify habitat needs and potential limitations of an urban population of a long-lived turtle species. Management and conservation recommendations were provided.

Massasauga Rattle Snake Inventories, Southeast Michigan – Conducted several intensive field surveys throughout Southeast Michigan to determine species presence, distribution, and habitat use using GPS/GIS.

Blanding's Turtle Telemetry and Headstart Project, Saginaw, Michigan- Project manager and lead scientist on repatriation program and telemetry study in a National Wildlife Refuge. Multipartner effort to collect eggs from rare Blanding's Turtle, raise hatchlings in local AZA certified zoo, and return1 to 2 year old animals back to wild. Track progress of released turtles and adult habitat use and movement.

Frog and Toad Survey, Pittsfield Township Michigan – Designed, coordinated, and managed a volunteer based Frog and Toad survey program to measure water quality and help identify sensitive environmental areas. Project encompassed portions of 29 square miles and covered over 320 wetlands resulting in over 200 volunteer hours and invaluable natural features data. This project has been used to help in the regulation of wetlands, identify potential land for preservation and helped the Township win an environmental award from Washtenaw County.

Salamander Monitoring Program, Ann Arbor Michigan – Designed and coordinated a volunteer based salamander monitoring programmed aimed at identifying the diversity, distribution, density, and overall health of salamanders. This novel program is the first of its kind targeted specifically at salamanders and utilizing trained volunteers.

Amphibian and Reptile Translocation and Monitoring Project, Meridian Township, Michigan – Conducted amphibian and reptile rescue and relocation in Meridian Township as part of a wetland restoration project. Assessed project success through amphibian and reptile inventories and monitoring.

Turtle Nest Predator Exclusion Structure Design and Monitoring, Ingham County Michigan – Designed predator exclusion nesting area for urban park which supported numerous species including the Blanding's Turtle, a Species of Species Concern in Michigan. Conducted monitoring of structure during nesting season to determine what species were using it and its effectiveness at preventing eggs from being destroyed.

Frog and Toad Survey Coordinator, City of Ann Arbor Michigan – Coordinated and managed a volunteer based Frog and Toad survey program since 2000 to measure the health of amphibian populations and their wetland habitat. Program covers over 120 wetlands throughout the City.

Reptile Habitat Structure Design, Pittsfield Township Michigan – Designed and monitored construction of snake hibernacula and turtle nesting areas in Township natural area to provided critical habitat currently lacking for these organisms within this natural area. Also monitored the use of this site by these organisms.

Herpetofauna Rescue, Translocation, and Monitoring, City of Ann Arbor Michigan- Designed, coordinated, and managed the rescue and translocations of over 5,000 amphibians and reptiles in the City and conducted follow up monitoring to assess population establishment and viability.