

RECLAMATION

Managing Water in the West

Categorical Exclusion Checklist

Evaluation of Environmental DNA as a Method for Detecting Giant Garter Snakes and Other Aquatic Vertebrate Species of Interest

MP-CEC-14-05

Prepared by:

Douglas Kleinsmith

Date: 8/18/14

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Concurred by:

Alan J. [Signature]
Archaeologist
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Date: 08/18/14

Concurred by:

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Native American Affairs Specialist
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Date: 8/19/2014

Concurred by:

Daniel Strait
Daniel Strait
Program Manager, Central Valley
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Mid-Pacific Regional Office

Date: 8/19/14

Approved by:

Anastasia T. Leigh
Anastasia T. Leigh
Regional Environmental Officer
Mid-Pacific Regional Office

Date: 8/26/2014



Mission Statements

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Proposed Action

Reclamation proposes to provide \$149,915 from the Central Valley Project Conservation Program (CVPCP) to United States Geological Survey, Western Ecological Research Center Dixon Field Station (USGS) to evaluate the utility of using environmental DNA (eDNA) to detect giant garter snakes in a controlled laboratory and in the field.

Exclusion Category

516 DM 14.5 A.3: Research activities, such as nondestructive data collection and analysis, monitoring, modeling, laboratory testing, calibration, and testing of instruments or procedures and non-manipulative field studies.

Scope of Work

Background

Giant garter snakes (GGS) (*Thamnophis gigas*) are limited to wetlands of the Central Valley of California. Because of their limited distribution and occurrence in wetland habitats, the Central Valley Project (CVP) has affected GGS through the conversion of wetlands to agricultural and urban uses. Currently, GGS depend almost entirely upon water delivered via the CVP for their continued existence in natural and restored wetlands and canals associated with rice agriculture. Although standard trapping survey protocols have been in use since the mid-1990s, detection probabilities of GGS remain low and determination of their distribution and the factors affecting it remain uncertain. Novel techniques using eDNA to detect rare or cryptic species have the potential to drastically improve detection probabilities for GGS, but the technique has not yet been evaluated for aquatic reptiles.

Objectives

The primary goal of the Proposed Action is to evaluate the potential of using eDNA as a noninvasive and cost-effective method of increasing detection probabilities for GGS. In particular, the Proposed Action's objectives are to:

1. evaluate the ability to detect giant garter snake DNA from water samples exposed to live individuals, feces, and shed skins in a controlled laboratory setting,
2. evaluate the persistence of giant garter snake eDNA in water under controlled conditions,
3. evaluate whether giant garter snake eDNA is detectable in the field at locations of known giant garter snake populations, and whether factors such as habitat type, time of year, and physical water characteristics affect the efficacy of giant garter snake eDNA detection in the field, and

4. evaluate targeted quantitative polymerase chain reaction (qPCR) vs. next generation sequencing as an alternative method of detecting GGS, while also determining the presence of other aquatic vertebrate species from eDNA samples.

Project Location

The Proposed Action will be located in the Sacramento Valley at three specific sites where known populations of GGS occur: Colusa National Wildlife Refuge (NWR; Colusa County, T15N R2W), Gilsizer Slough (Sutter County, T13 & 14N R2E), and the Natomas Basin (Sacramento County, T10N R4E) (Fig. 1). In addition, laboratory studies will be conducted at the USGS Western Ecological Research Center's (WERC) Dixon Field Station using GGS captured during prior studies as a controlled evaluation for the detection of GGS using eDNA. All processing and analysis of genetic samples will occur at the USGS WERC San Diego Field Station.

Methodology

USGS proposes to evaluate the effectiveness of sampling eDNA to detect GGS using laboratory experiments and field sampling. The laboratory experiment will evaluate the ability to detect giant garter snake eDNA from different sources and the persistence of eDNA in a controlled setting. The field sampling will evaluate the ability to detect giant garter snake eDNA under field conditions, where snake behavior, population density, habitat type, water chemistry, temperature, and flow rate vary among sites and over time. USGS will also use the field samples to evaluate the use of next generation genetic sequencing to obtain information on the status of other aquatic non-native and sensitive vertebrate species.

Sampling water for eDNA of GGS at each field site will begin in April 2015, and will occur monthly until October 2015. Laboratory experiments and sampling will occur April 2015 – June 2015. All samples will be collected by October 2015. At the conclusion of sample collection, samples will be shipped to the USGS San Diego Field Station for genetic analysis. USGS anticipates genetic analysis of samples will be completed by April 2016, when data analysis and writing will commence. A final report will be completed by December 31, 2016.

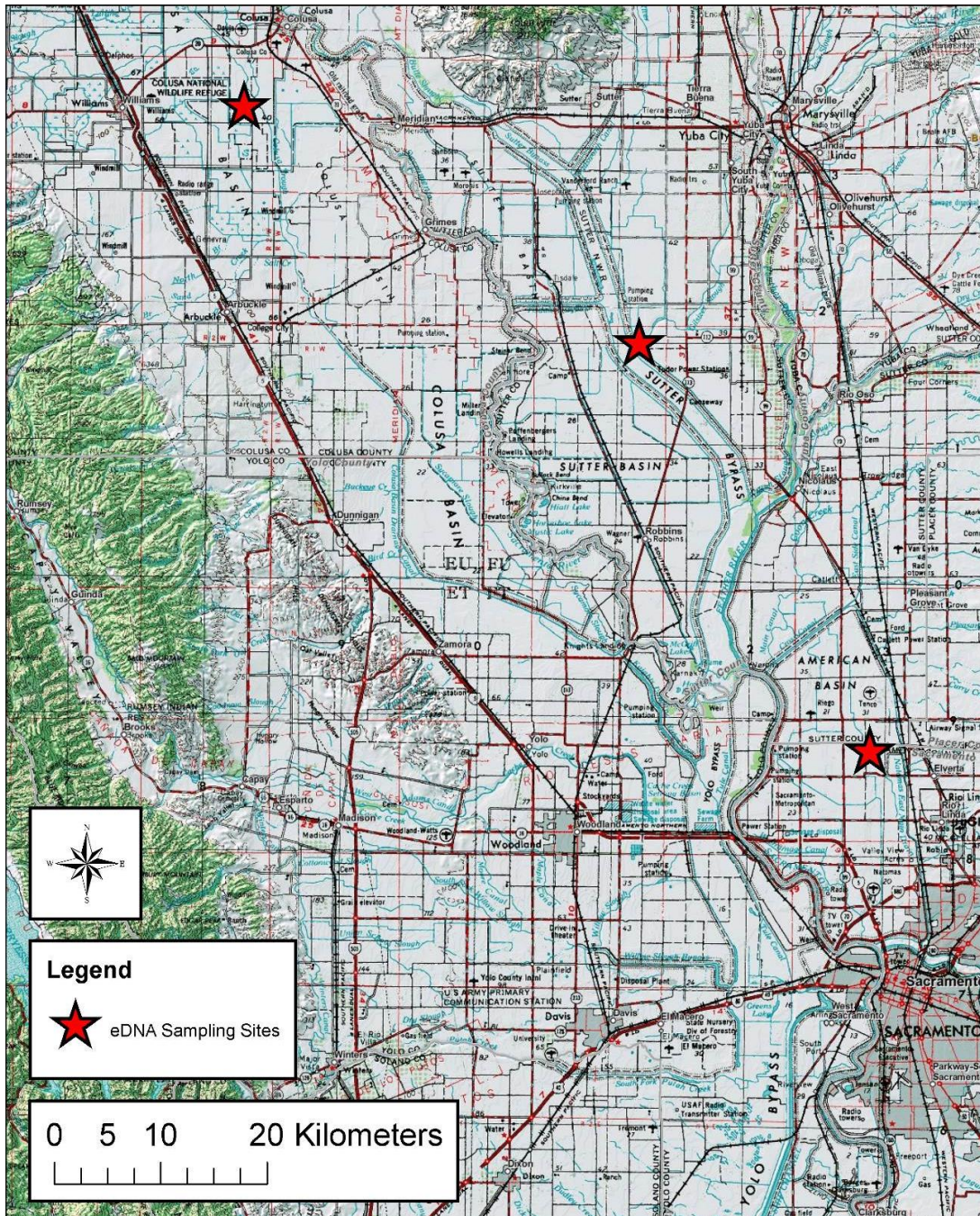


Figure 1. Giant Garter Snake eDNA Field Sampling

Extraordinary Circumstances

Below is an evaluation of the extraordinary circumstances as required in 43 CFR 46.215.

- | | | | | | | |
|---|----|-------------------------------------|-----------|--------------------------|-----|--------------------------|
| 1. This action would have a significant effect on the quality of the human environment (40 CFR 1502.3). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 2. This action would have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources (NEPA Section 102(2)(E) and 43 CFR 46.215(c)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 3. This action would have significant impacts on public health or safety (43 CFR 46.215(a)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 4. This action would have significant impacts on such natural resources and unique geographical characteristics as historic or cultural resources; parks, recreation, and refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (EO 11990); flood plains (EO 11988); national monuments; migratory birds; and other ecologically significant or critical areas (43 CFR 46.215 (b)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 5. This action would have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks (43 CFR 46.215(d)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 6. This action would establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects (43 CFR 46.215 (e)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 7. This action would have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects (43 CFR 46.215 (f)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |

- | | | | | | | |
|--|----|-------------------------------------|--|--------------------------|-----|--------------------------|
| 8. This action would have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by Reclamation (LND 02-01) (43 CFR 46.215 (g)). | No | <input checked="" type="checkbox"/> | Uncertain
<i>See
Attachment A</i> | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 9. This action would have significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have significant impacts on designated critical habitat for these species (43 CFR 46.215 (h)). | No | <input checked="" type="checkbox"/> | Uncertain
<i>See
Attachment B</i> | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 10. This action would violate a Federal, tribal, State, or local law or requirement imposed for protection of the environment (43 CFR 46.215 (i)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 11. This action would affect ITAs (512 DM 2, Policy Memorandum dated December 15, 1993). | No | <input checked="" type="checkbox"/> | Uncertain
<i>See
Attachment C</i> | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 12. This action would have a disproportionately high and adverse effect on low income or minority populations (EO 12898) (43 CFR 46.215 (j)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 13. This action would limit access to, and ceremonial use of, Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (EO 13007, 43 CFR 46.215 (k), and 512 DM 3)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |
| 14. This action would contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act, EO 13112, and 43 CFR 46.215 (l)). | No | <input checked="" type="checkbox"/> | Uncertain | <input type="checkbox"/> | Yes | <input type="checkbox"/> |

NEPA Action Recommended

☒ CEC – This action is covered by the exclusion category and no extraordinary circumstances exist. The action is excluded from further documentation in an EA or EIS.

☐ Further environmental review is required, and the following document should be prepared.

☐ EA

☐ EIS

Attachment A
Cultural Resources Concurrence Memo

**CULTURAL RESOURCE COMPLIANCE
Mid-Pacific Region
Division of Environmental Affairs
Cultural Resources Branch**

MP-153 Tracking Number: 14-MPRO-266

Project Name: Evaluation of Environmental DNA as a Method for Detecting Giant Garter Snakes

NEPA Document: CEC

Project Manager/NEPA Contact: Dan Strait

MP 153 Cultural Resources Reviewer: Adam Nickels



Date: 08/13/14

The proposed undertaking to use Federal appropriations to fund studies that will test whether or not Environmental DNA is a good method for detecting Giant Garter Snakes and other aquatic vertebrate species of interests has no potential to cause effects to historic properties pursuant to 36 CFR Part 800.3(a)(1).

The action will involve conducting genetic analysis in a lab, collection species of interest, collecting water samples, and preparing reports. There will be no ground disturbance or landscape alteration resulting from these actions.

After reviewing the proposed project description I have concluded that no additional cultural resources considerations are necessary for this undertaking resulting in the conclusion of the Section 106 process for this undertaking. This conclusion statement is intended to convey the conclusion of the Section 106 process for this undertaking.

Thank you for providing the opportunity to comment on this undertaking. Please retain a copy of this conclusion statement with your administrative record.

Attachment B
Endangered Species Compliance Documentation

MP-152
ENV-7.00

MEMORANDUM

To: Natural Resources Specialist
Attn: MP-152 (DStrait)

From: Michael Inthavong
Natural Resources Specialist

Subject: Endangered Species Act Section 7 Coverage for Giant Garter Snake Regarding 2014 Central Valley Project Conservation Program Interagency Agreement Funding (MP-CEC-14-05, Interagency Agreement No. R14PG00081)

The Bureau of Reclamation proposes to provide funding through the Central Valley Project Conservation Program to the U.S. Geological Survey (USGS) through an interagency agreement to conduct and evaluate environmental DNA (eDNA) testing for the purpose of detecting presence of the federally-listed as threatened giant garter snake (GGS – *Thamnophis gigas*) in laboratory and field settings. Field studies will occur at the Colusa National Wildlife Refuge in Colusa County, Gilsizer Slough in Sutter County, and the Natomas Basin in Sacramento County, California. Laboratory eDNA testing will be conducted at the USGS Western Ecological Research Center's Dixon Field Station and data processing and analysis will occur at their San Diego Field Station. Refer to MP-CEC-14-05 for additional information regarding project objectives, locations, and methodology.

Water sampling for GGS eDNA will occur monthly at each field location for approximately seven months and would conclude with laboratory testing and analysis in April 2016. A final report is anticipated to be available by December 2016. Potential impacts to GGS are expected to occur through the direct take of GGS eDNA (i.e. DNA present in fecal matter and/or skin cells) detected in water samples. In addition, laboratory testing of water samples will include placing a live GGS (previously authorized to be captured for another project) in a water-filled aquarium for 24 hours, and then removed after which water sampling for eDNA would be conducted. USGS has obtained a valid Section 10(a)(1)(a) permit (TE-157216-2) from the U.S. Fish and Wildlife Service for activities proposed to be funded through this action.

Reclamation has determined that providing funding to the USGS to conduct water sampling for GGS eDNA would have no additional adverse effects or exceed take from what was previously authorized via USGS' 10(a)(1)(a) permit. Since take as prohibited under Section 9 has been granted by this Section 10 permit, this concludes Reclamation's responsibility under Section 7 of the Endangered Species Act (16 U.S.C. § 1531 *et seq.*). However, if new information is made available, the project description changes, and/or USGS does not fully comply with the terms

and conditions prescribed in their 10(a)(1)(a) permit, then Reclamation may need to revisit its Section 7 determination. Please retain a copy of this memo as part of the administrative record.

Attachment C
Indian Trust Assets Concurrence Memo



KLEINSMITH, DOUGLAS <dkleinsmith@usbr.gov>

Re: ITA request for proposed funding of eDNA research for giant garter snakes

RIVERA, PATRICIA <privera@usbr.gov>

Thu, May 15, 2014 at 9:18 AM

To: DOUGLAS KLEINSMITH <dkleinsmith@usbr.gov>

Doug,

I reviewed the project proposal to provide \$157,591 from the Central Valley Project Conservation Program (CVPCP) to United States Geological Survey, Western Ecological Research Center Dixon Field Station to evaluate the utility of using environmental DNA (DNA) to detect giant garter snakes in a controlled laboratory and in the field, and find there is no potential to impact Indian Trust Assets. The nearest Indian Trust Asset is Auburn Rancheria, approximately 13 miles northeast of the project location.

Patricia Rivera
Native American Affairs Program Manager
US Bureau of Reclamation
Mid-Pacific Region
2800 Sacramento, California 95825
(916) 978-5194