



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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MAR 26 2014

Refer to NMFS No: 2013/9391

Dr. Raymond I. Carruthers
Research Leader and Scientist
USDA-Agricultural Research Service
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Albany, California 94710

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response and Fish and Wildlife Coordination Act Recommendations for the *Egeria densa* Control Program

Dear Dr. Carruthers:

On January 24, 2014, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the U.S. Department of Agriculture (USDA) proposed 4-year (2014-2017) *Egeria densa* Control Program (EDCP) in the Sacramento-San Joaquin Delta (Delta) and the San Joaquin River (SJR) basin is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA). USDA serves as the Federal nexus for a cooperative project with its applicant, the California Department of Parks and Recreation, Division of Boating and Waterways (CDBW), with regard to managing invasive plants in the Delta and its tributaries and providing research and scientific expertise. This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

NMFS also received your request for a written concurrence that the USDA proposed EDCP in the Delta and SJR basin will not adversely affect essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Thus, consultation under the MSA is not required for this action.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation



Tracking System (<https://pcts.nmfs.noaa.gov/ptcs-web/homepage.pcts>)¹. A complete record of this consultation is on file at the California Central Valley Area Office in Sacramento, California.

Description of the Proposed Action

USDA and CDBW propose to utilize chemical treatment and physical control methods to control *Egeria densa*. USDA and CDBW will use herbicides as the primary method to control *Egeria densa* in the Delta and SJR waterways. USDA and CDBW use four herbicide products: Sonar, Clearcast, Galleon, and Reward. Table 1 provides a description of the products and their characteristics.

Table 1. Environmental effect concentration (EEC) and environmental fate of the proposed herbicides

Product	Active Ingredient (a.i.)	Estimated Environmental Concentration (mg/L)		Treatment Duration (day)	Aquatic DT50 [§] (day)	†Koc	‡BCF
		Acute	Chronic				
Sonar	Fluridone	0.03	0.01	84	20 (5-60)	1000	97
Clearcast	Imazamox	0.25	0.25	14-28	5-15	NA	0.1
Galleon	Penoxsulam	0.05	0.015	56-84	1.5-14	1.4	100
Reward	Diquat Dibromide	0.396	0.0459	14-21*	2-21	2,184,750	1

*These are waiting days before a second treatment starts.

[§]Estimated dissipation half-life of the active ingredient

[†]Koc is soil organic carbon-water partitioning coefficient

[‡] BCF is the bioconcentration factor

As an alternative to chemical treatment, USDA and CDBW propose to use physical control methods such as diver handpicking, suction harvesting, and benthic barriers to limit the growth and spread of *Egeria densa*. The EDCP emphasizes chemical treatment, with limited physical control. The maximum application concentration for fluridone and penoxsulam is 30 ppb and 50 ppb, respectively (CDBW 2012, see supplemental BA). The maximum application rate for imazamox and diquat is 250 ppb and 370 ppb, respectively (CDBW 2012, see supplemental BA). The maximum annual treatment area for each control method is provided in Table 2. Treatment areas will vary from year to year. For example, USDA and CDBW estimate that imazamox will be used on approximately 200 acres in the 2014 season. USDA and CDBW propose to increase the treatment area to no more than 1,000 acres over the next several years if imazamox is an effective treatment method in the Delta. If USDA and CDBW increase the use of imazamox, they will reduce the amount of fluridone applied. The total number of acres treated with herbicides will not exceed 4,000 acres in any given year, and typically less, as observed from past monitoring data (CDBW 2012). Treatment acres are not additive; the EDCP will simply alternate the use of herbicides within the action area. The total herbicide application acreage represents a small fraction (5.8 percent) of the total waterways acres in the proposed action area.

¹ Once on the PCTS homepage, use the following PCTS tracking number within the Quick Search column: WCR-2013-9391, or search for the project by name: *Egeria densa* Control Program.

Table 2. Estimated treatment area for each of the proposed control methods for 2014-2017

Control Method	Maximum Annual Treatment Area (acre)
Fluridone	3,500
Imazamox	1,000
Penoxsulam	200
Diquat	50
Diver Handpicking and Suction Harvesting	20
Benthic Barriers	20
Maximum annual acreage to be treated in the EDCP	4,000

Procedure for Controlling *Egeria densa*

There are a number of management activities within the EDCP that support the program. USDA staffing for the EDCP will include a managing supervisor, administrative support, and scientific staff. Within CDBW, employees that work directly on the EDCP will include a manager, a senior environmental scientist, field environmental scientists, a field supervisor, a GIS mapping specialist, and field crew members. CDBW may add or reduce staff to support program needs over time. The EDCP also receives management and administrative support from the executive office within CDBW.

Prior to the start of each treatment season, CDBW will conduct environmental awareness training for all field crew members. The training will include: species identification and impact avoidance guidelines, and protocol for identification and protection of Chinook salmon, steelhead, green sturgeon, and designated critical habitats. In addition, field crew members will be trained on use and calibration of equipment and EDCP Operations Management Plan.

USDA and CDBW will implement pre- and post-season surveys to identify locations and coverage of *Egeria densa*, and will supplement these formal surveys with mid-season evaluations of *Egeria densa* coverage. Beginning in mid-February, and again in the fall, field crews will conduct visual surveys of all treatment sites. For each site, crews will record the extent of *Egeria densa* coverage (acres and percent coverage) and status of *Egeria densa* at the site. In the early season survey, field crews will identify problem areas such as those with the greatest impact on navigation, public safety, nursery areas, and sites close to pumps or other structures. This survey information will be used to help prioritize treatment locations at the start of the treatment season, and to help measure efficacy of treatment at the end of the season. During the treatment season, crews working throughout the Delta will continue to monitor and record *Egeria densa* coverage by site. CDBW environmental scientists will conduct additional *Egeria densa* monitoring throughout the year at selected locations, including rake surveys and quantitative measures of bio-volume (percent of volume of *Egeria densa* in a given site) and bio-cover (percent of coverage of *Egeria densa* in a given site). These surveys will provide detailed quantitative metrics of the change in bio-volume and bio-cover in treated sites, as compared to control sites, during and after a treatment season. CDBW will also conduct hydroacoustic (sonar) monitoring surveys in 2014-2017.

USDA and CDBW will prepare an annual report for the EDCP and submit the report to NMFS by February 1 of each year starting 2015. This annual report will summarize infestation levels, treatment acreage and types, amount of each herbicide used, materials and methods, and water

quality monitoring results (including herbicide concentration and dissolved oxygen). NMFS will review the report and assess whether or not the EDCP poses negative effects to listed anadromous fish species and their critical habitats from the use of the herbicides, particularly the two herbicides new to the USDA and CDBW EDCP - imazamox and penoxsulam - and the relatively highly toxic herbicide diquat (Paul *et al.* 1994).

Chemical Treatment

USDA proposed to use four herbicides – fluridone, imazamox, penoxsulam, and diquat - to control *Egeria densa*. Fluridone has been, and will continue to be, the primary herbicide utilized. Penoxsulam and imazamox are new to the EDCP. Diquat had been utilized in limited quantities, although not since 2005. Due to its rapid mode of action, spot applications of diquat at selected times and sites may reduce the overall amount of herbicide needed to control *Egeria densa*.

Herbicide applications will typically be conducted once or twice per week over a 2- to 16-week treatment period. Prior to the start of the treatment season, CDBW develops specific herbicide treatment protocols that are designed to maintain a pre-determined concentration of herbicide in the water column during the treatment period. CDBW will apply fluridone at a maximum concentration of 30 ppb over an 8- to 16-week period, starting in March or April. CDBW will treat approximately 1,200 to 3,500 acres per year with fluridone, which represents 1.8 to 5.1 percent of the proposed action area (CDBW 2012, supplemental BA). CDBW will apply penoxsulam at a maximum concentration of 50 ppb per treatment application (March to November during an 8- to 12-week period). Typical application concentrations of penoxsulam in the water column range from 5 ppb to 20 ppb. CDBW will treat a maximum of 200 acres per year with penoxsulam, which represents 0.29 percent of the proposed action area (CDBW 2012 supplemental BA). CDBW will apply imazamox over a 2- to 7-week period at a maximum single treatment concentration of 250 ppb. Typical application concentrations of imazamox in the water column range from 25 ppb to 125 ppb. CDBW will limit the use of imazamox to 100 acres per year, representing 0.15 percent of the proposed action area.

The action agency has agreed to modify the use of diquat to eliminate all adverse effects to listed species and their designated critical habitats. Diquat is a contact herbicide and readily binds to sediment. Diquat is a fast acting herbicide with a half-life of less than 48 hours. Diquat will only be utilized by the EDCP for emergency applications from August 1st through November 30th of each year. Emergency conditions consist of *Egeria densa* growth that completely impedes navigation of Delta water, such as a completely blocked slough that would impair the movement of emergency response vessels. Diquat will be applied at a maximum concentration of 370 ppb per application. If follow-up treatment is necessary, diquat will be applied at least 14 days after the initial treatment application (per label requirements). Treatment will be limited to a total of 50 treatment acres per year, representing 0.075 percent of the proposed action area (CDBW 2012, see section on Modifications to the EDCP).

Treatment crews use injection hoses to apply aqueous herbicide into treatment areas, and a broadcast method to apply pellets. Both methods are applied from airboats or outboard motor workboats. Treatment crews follow specific requirements to account for wind, dissolved

oxygen, pH, drinking water intakes, agricultural intakes, and total acres treated. Treatment crews follow all label requirements.

The ideal herbicide treatment time for *Egeria densa* is when the plant is in the early growth phases, typically starting in March in the Delta. Treating *Egeria densa* during the early growth phase will increase herbicide efficacy and reduce the total amount of herbicide required. When appropriate, CDBW will also conduct a second series of treatments starting in September during *Egeria densa*'s second growth phase. The need for these second treatments will be determined on a site and season basis, depending on the response of *Egeria densa* to the first treatment.

Herbicide applications to treat submersed aquatic vegetation such as *Egeria densa* requires an herbicide rate calculation on the basis of the volume of water to be treated. Water flow, such as that resulting from the diurnal tides in the Delta, is a concern because it will reduce both herbicide concentrations and contact time with the target concentration. EDCP herbicide treatment protocols will be developed assuming static water conditions due to the difficulty in predicting the impact of tidal flows in each site, thus, actual herbicide concentrations in a site will be lower than application rates.

Once CDBW has determined the treatment sites for the season, the management team will develop a treatment protocol for each site and treatment polygon. The treatment polygon refers to a specifically defined area within the treatment site, infested with *Egeria densa*, in which herbicides will be applied. The treatment protocol will identify the herbicide active ingredient(s) and formulation(s) that will be utilized, number of treatment weeks, application concentrations, and total application concentrations. The number of treatment weeks and application concentrations will depend on the herbicide, formulation, status of *Egeria densa* at the site, and water flow characteristics.

Through the use of FasTEST (a procedure to rapidly and accurately analyze aquatic herbicide concentrations in the water), crews will typically treat each site once a week for the duration of the treatment protocol for that site. For fluridone, CDBW has found that in most Delta locations, a 12-week treatment protocol is effective. CDBW will evaluate treatment protocols for penoxsulam and imazamox to determine the most effective treatment period in the Delta environment. Based on herbicide characteristics, it is likely that penoxsulam will require an 8- to 12-week treatment period, and imazamox will require a shorter, 2- to 7-week treatment period. As CDBW begins to utilize these new herbicides, CDBW will closely monitor results to determine ideal treatment periods, which could vary from these preliminary estimates. Diquat will be used in limited instances to supplement the other herbicide treatments, and/or when public safety or other factors require that the weed be killed more rapidly.

USDA and CDBW will follow the fish passage protocol to ensure that during herbicide applications, a zone of the treatment area is left untreated for passage of listed fish species at all times, taking into account the location and size of treatment areas.

- 1) In slow-moving and back-end sloughs infested with *Egeria densa*, USDA and CDBW will treat up to 30 percent of the *Egeria densa* mat at one time. Mats will be treated in up to 3-acre strips, leaving at least 100-foot buffer strips between treated areas. The

untreated buffer strips and remaining 70 percent of the *Egeria densa* mat will be treated at least three more times following the initial treatment (in 30 percent increments). These follow-up treatments will take place at 3-week intervals.

- 2) In Delta and SRJ tidal waters, USDA and CDBW will treat up to 50 percent of the *Egeria densa* mat at one time. Mats will be treated up to 3-acre strips, leaving at least 100-foot buffer strips between treated areas.

Daily treatments occur Monday through Thursday when weather, wind-speed, and other environmental conditions are favorable for treatment to be maximized. On any given treatment day, treatment acres per day are limited by: (1) the number of crews available; (2) travel time to reach the site; (3) time required to set-up, conduct monitoring, and treat a site; (4) the amount of *Egeria densa* growing at a particular site; (5) the herbicide label restrictions; (6) fish passage protocols; and (7) weather and tide conditions. The crew can treat, on average, between 5 and 16 acres per day, based on historical data from 2007 through 2011.

Physical Control

In addition to herbicide treatments, EDCP proposes, in selected situations, to utilize handpicking and suction harvesting (by SCUBA divers), and benthic barriers. Evaluation of biological control methods is currently experimental. Handpicking and suction harvesting by SCUBA divers will primarily be utilized to reduce plant biomass in sensitive sites where chemical treatments are less effective or cannot be utilized.

Diver-assisted handpicking of *Egeria densa* includes the use of a small rake or hand-tool when needed, to ensure that the plant is completely removed. Divers will place the plants in net bags. The collected plants will be disposed of in approved locations away from the water's edge and sensitive habitats; typically in a nearby farm land. Handpicking is most effective when used to remove small, localized infestations, and/or in conjunction with benthic barriers.

Diver-operated suction harvesting is equivalent to vacuuming the plants, which are collected in a basket on a boat, barge or nearby dock. Licensed SCUBA divers hold a 3 to 5 inch- wide hose attached to a high pressured water pump located on the boat, barge or dock. The hose extends approximately 50 feet from the pump. The pump creates a venturi effect, creating suction to pull the plant through the hose. This method is highly selective, as trained divers can literally pick and choose which plants to harvest. This method can cause temporary (10-15 minutes) disruption of the soils depending on substrate and depth of plant roots. If sediment disruptions cause significant turbidity, the EDCP will use silt curtains to localize the temporary increase in turbidity. In addition, if sediments in the area contain heavy metals and other toxic materials, these pollutants can be released in the water column. Aquatic wildlife, such as fish, mussels, and other prey species can be suctioned up through the hose. There is potential for listed species to be suctioned up through the hose without going through the motor. To minimize the impact to listed species, the EDCP will utilize this method in fast-moving water, small high-use areas, when listed species are not present, and as a follow up to herbicide treatment.

The CDBW will use benthic barriers in isolated infested areas within the proposed action area. The use of benthic barriers as a method to control plant growth is well-established; however the method is new to the EDCP. Benthic barriers consist of a physical cover placed over aquatic weeds to prevent sunlight from reaching the plants. The EDCP will utilize 10-foot by 40-foot sheets of synthetic material that allows gas to escape and is not detrimental to benthic macroinvertebrates. The benthic barriers will be installed by SCUBA divers and will be held in place with 3/8 inch rebar for 6 to 8 weeks and will cover a maximum of 2 acres. The benthic barriers are most effective when the weeds are no more than a foot in height. This involves installing the barriers early in the growing season or using hand picking or diver-operated suction harvesting to cut the weeds down to one foot before installing the barriers. Benthic barriers are non-selective, killing all plants underneath the barrier. There is potential for benthic barriers to kill macroinvertebrates that are under the mat, although some newer materials do not result in effects to macroinvertebrates. To reduce impacts to prey species and fish migration patterns (primary green sturgeon), the EDCP will utilize an integrated pest management approach and benthic barriers in selected isolated locations that are likely to be most effective for plant removal and approved by NMFS. These areas include relatively small areas (2 acres or less) and high-intensity use areas such as boat launch areas and swimming areas.

Timing of Control Activities

USDA proposed a calendar-based schedule for EDCP activities from 2014 to 2017 (Table 3). The actual start date will depend on a combination of calendar-dates, field surveys of *Egeria densa* to evaluate plant growth, and juvenile fish monitoring to determine presence of listed fish species. The objective of this approach is to improve EDCP chemical treatment efficacy without negatively impacting listed fish species. Seasonal temperature fluctuations in the Delta impact both *Egeria densa* growth and migratory fish activity. These seasonal temperature fluctuations can become relatively extreme, and may make calendar-based start dates less relevant.

Table 3. Proposed calendar-based control activities and application window (shaded) for the EDCP for 2014-2017

Control Method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fluridone												
Imazamox												
Penoxsulam												
Diquat												
Diver Handpicking												
Suction Harvesting												
Benthic Barriers												

Treatment start dates do not reflect presence or absence of listed anadromous fish species. USDA and CDBW will consult several state and federal juvenile fish monitoring programs to evaluate presence of listed fish species. These monitoring programs provide daily or weekly data for the number of juvenile fish migrating to or exiting the Delta. CDBW environmental scientists will compare results from fish monitoring with scheduled treatment sites to determine likely presence of listed fish species. If monitoring data indicate that threatened or endangered fish are likely to be present in the treatment site, CDBW will delay treatment.

On any given treatment day, actual start of treatments depends on the distance from CDBW's boat dock to the treatment site. Field crews begin their work day at 6:30 a.m., thus treatment activities generally occur in mid-morning, and again in early-afternoon.

Physical control methods such as diver-assisted handpicking, diver-operated suction harvesting, and benthic barriers will typically occur early in the treatment season, but could be employed at any time during the treatment season to address new infestations or infestations in high-use areas. CDBW will not employ these methods in areas or at times when listed fish species are likely to be present.

Description of the Action Area

The project area for the EDCP is specified in statute, as follows: "the Delta, its tributaries, and the marsh" (Harbors and Navigation Code Section 64). The State of California legal definition of the Sacramento-San Joaquin Delta (Delta) includes the six counties of San Joaquin, Yolo, Sacramento, Solano, Contra Costa, and Alameda. The general boundaries for the project area include the legal Delta and its tributaries, as follows:

- West up to and including Sherman Island at the confluence of the Sacramento and San Joaquin Rivers;
- West up to the Sacramento Northern Railroad to include water bodies north of the southern confluence of the Sacramento River and Sacramento River Deep Water Ship Channel;
- North to the northern confluence of the Sacramento River and Sacramento River Deep Water Ship Channel, plus waters within Lake Natoma;
- South along the San Joaquin River to Mendota, just east of Fresno;
- East along the San Joaquin River to Friant Dam on Millerton Lake;
- East along the Tuolumne River to LaGrange Reservoir below Don Pedro Reservoir; and
- East along the Merced River to Merced Falls, below Lake McClure.

Table 4 shows the number of annual treatment areas that vary across application seasons (2007-2012), within which only fluridone was used to control *Egeria densa*. Due to tidal exchange, the action area is expected to encompass 7 percent of the Delta for the 2014-2017 application seasons.

Table 4. Fluridone treatment (acres/year) from 2007-2012 in the Sacramento-San Joaquin Delta

Year	Number of Sites	Site Treated (acres)	Site Water (acres)	Percent of Site Area Treated (%)	Percent of Delta Treated (%)
2007	3	2,571	3,466	74	4.2
2008	3	2,571	3,466	74	4.2
2009	5	228	836	27	0.4
2010	3	641	1,768	36	1.0
2011	9	3,195	4,976	64	5.2
2012	18	2,663	6,773	39	4.3
Average	7	1,978	3,548	53	3.2

Interrelated and Interdependent Actions

An interrelated action is part of a larger action and depends on the larger action for its justification. An interdependent action has no independent utility apart from the action under consultation. There are no interrelated or interdependent actions in the proposed action.

Action Agency's Effects Determination

USDA and CDBW determined that the proposed use of fluridone, penoxusulm, imazamox and diquat based herbicide products are not likely to adversely affect (NLAA) federally listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley (CV) spring-run Chinook salmon (*O. tshawytscha*), threatened California CV steelhead (*O. mykiss*), or the Southern distinct population segment (DPS) of North American green sturgeon (*Acipenser medirostris*), or any of their respective designated critical habitats (Table 5).

Table 5. Listed species status and relevant habitat designation

Listed Species	Scientific Name	Status	FR Notices ([†] species listing and [‡] habitat designation)
CV spring-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	[†] 76 FR 157, August 15, 2011 [‡] 70 FR 52488, September 2, 2005
Sacramento River winter-run Chinook salmon	<i>O. tshawytscha</i>	Endangered	[†] 70 FR 37160, June 28, 2005 [‡] 58 FR 33212, June 16, 1993
California CV steelhead	<i>O. mykiss</i>	Threatened	[†] 76 FR 157, August 15, 2011 [‡] 70 FR 52488, September 2, 2005
North American green sturgeon	<i>Acipenser medirostris</i>	Threatened	[†] 71 FR 17757, April 7, 2006 [‡] 74 FR 52300, October 9, 2009

The action area contains waterways where Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, California CV steelhead, and/or the Southern DPS of North American green sturgeon may be present.

The three listed salmonids have the greatest potential to occur in the action area primarily between November and June, based on the timing of adult and juvenile migrations in and through the waterways of the Delta. Juvenile steelhead may occur in the SJR and its tributaries from October through June. Green sturgeon presence is presumed to be year-round within the Delta.

The action area includes waters that have been designated as critical habitat for CV spring-run Chinook salmon, California CV steelhead, and the Southern DPS of North American green sturgeon. The essential features of critical habitat in the action area for the listed species include areas for emigration, rearing, and/or smoltification of juveniles and immigration of adults for steelhead and salmonids. The essential features of critical habitat in the action area for green sturgeon include two categories: (1) freshwater riverine systems (food resources, substrate type and size, water flow, water quality, migratory corridor, water quality and depth); and (2) estuarine areas (food resources, water flow, water quality, migratory corridor, water depth, and sediment quality). The essential feature attributes of prey availability, primary productivity,

shelter availability, and water quality (*i.e.*, dissolved oxygen) are the primary assessment endpoints addressed when evaluating the effects of the proposed action on the designated critical habitat. Information evaluated for effects to prey, primary production, or shelter includes survival, growth, reproduction, or abundance of prey (*e.g.*, macroinvertebrates), phytoplankton, and macrophytes.

USDA and CDBW evaluated the individual fitness of exposed salmonids/green sturgeon and developed a risk hypothesis for each species. Specifically, USDA and CDBW determined that the proposed use of fluridone, penoxsulam, imazamox, and diquat is not likely to:

- a) kill salmonids/green sturgeon from direct exposure,
- b) reduce salmonid and green sturgeon reproduction,
- c) reduce salmonid and green sturgeon growth through impacts on the availability and quantity of prey, or
- d) accumulate in salmonids and green sturgeon, which would impair fitness.

USDA and CDBW also evaluated the effects from other stressors of the action and contributing environmental factors and developed risk hypothesis for critical habitat. Specifically, USDA and CDBW determined that the proposed use of fluridone, penoxsulam, imazamox, and diquat is not likely to cause adverse effects to critical habitat from:

- a) exposure to each of these four herbicides,
- b) exposure to degradates of these four herbicides,
- c) exposure to other pesticides present in the action area that act in combination with the four herbicides to increase effects, and
- d) exposure to elevated temperatures, which may enhance the toxicity of the stressors of the action.

The EDCP will treat approximately six percent of the Delta waters during the 9-month application period. The EDCP activities are expected to improve key ecosystems services (*e.g.*, enhancing the already degraded critical habitat and water quality, and prey availability for salmonids and green sturgeon by controlling *Egeria densa*).

Consultation History

On January 4, 2013, NMFS received the USDA request for initiation of formal section 7 consultation under the ESA for the EDCP covering applications seasons 2013 to 2017.

On January 16, 2013, a meeting was held at NMFS' Sacramento office between staff from USDA, CDBW and NMFS to discuss the EDCP consultation and the necessary information to be included in the project's biological assessment (BA).

On May 9, 2013, NMFS received a written request from USDA for section 7 consultation for the EDCP covering applications season 2013. USDA withdrew the original request for section 7 consultation concerning a new 5-year application period, and instead requested formal section 7 consultation regarding a 1-year extension of the EDCP via an amendment to the standing biological opinion for application seasons 2007-2012.

On May 24, 2013, NMFS responded to the USDA and confirmed that sufficient information had been provided by USDA to initiate consultation. NMFS concurred with USDA's determination that the proposed use of fluridone-based herbicide products was not likely to adversely affect Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, California CV steelhead, or the Southern DPS of North American green sturgeon, or any of their designated critical habitats for the 2013 application season.

On September the 17, 2013, NMFS received a written confirmation of request from USDA to a revised consultation under section 7 of the ESA for the 2014 -2017 application season regarding the modified and limited use of diquat.

On December 17, 2013, a meeting was held at NMFS' Sacramento office between staff from USDA, CDBW, USFWS, and NMFS to discuss the EDCP consultation. NMFS requested that USDA revise the risk assessment approach to listed species and their critical habitat to integrate the new 4-agency interim approach [National Research Council (NRC 2013)]. NMFS also requested an assessment of EFH to be included in the project's BA supplemental documentation.

On January 2, 2014, NMFS met with CDBW to discuss the new risk assessment approach in the supplement to the BA. In the meeting, USDA and CDBW provided NMFS with the first draft supplement to the BA.

On January 9, 2014, NMFS responded with written comments to the first draft of the supplement to the BA and confirmed that insufficient information had been provided by USDA and CDBW. NMFS requested additional toxicity information on penoxsulam and imazamox; information on the spatial and temporal co-occurrence of the listed species and their critical habitat; and revisions to new interim risk assessment approach.

On January 24, 2014, NMFS received a letter of request for informal consultation from USDA and CDBW, the EDCP second draft supplement to the BA, and additional background toxicity data for penoxsulam and imazamox as requested by NMFS on January 9, 2014.

On January 28, 2014, NMFS met with USDA and CDBW to discuss minor revisions and comments to the second draft of the supplemental document. NMFS also requested more in depth analyses on the effects to EFH.

On February 3, 2014, NMFS responded by email and provided written comments to the second draft of the supplement to the BA. Specifically, in the written comments, NMFS requested that USDA and CDBW review the latest information on native plant distribution (*e.g.*, *Stukenia* coverage) in the Delta for the EFH effects analyses.

On February 4, 2014, NMFS emailed maps to USDA and CDBW of *Stukenia* coverage from 1993-2012.

On February 7, 2014, NMFS met with USDA and CDBW to discuss written comments to the second draft of the supplement to the BA provided by NMFS on February 3, 2014.

On February 14, 2014, NMFS received, by email, from USDA and CDBW, the EDCP third draft of the supplement to the BA, and additional background toxicity data for penoxsulam and imazamox, as requested by NMFS on January 28th and February 3rd 2014.

On February 19, 2014, NMFS informed USDA and CDBW, by email, that all of the information necessary to initiate consultation for the EDCP on federally listed anadromous fish species and their designated critical habitats within the action area, as well as EFH, was received.

ENDANGERED SPECIES ACT

Effects of the Action

Under the ESA, “effects of the action” means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

NMFS has received all of the information necessary to initiate consultation on federally listed anadromous fish species and their designated critical habitats within the action area. The effects of the proposed action are reasonably likely to include:

Chemical Controls

NMFS conducted effects analyses and risk assessment using the data and information provided by USDA and CDBW (USDA 2012) as well as other data from the U.S. Environmental Protection Agency’s (USEPA’s) ECOTOX database (USEPA 2013), journal articles, and technical reports (Hamelink *et al.* 1986, Habig 2004, Laetz *et al.* 2009, MacNeal *et al.* 2010, Michel *et al.* 2004, Nielsen and Dahllof 2007, Reylea 2009, Schlenk *et al.* 2012, Scholz *et al.* 2012). The NMFS’ concurrence with USDA and CDBW’s determination is based on the results of the risk assessment framework that follows an interim approach recommended by the NRC in the form of a report entitled, *Assessing Risks to Endangered and Threatened Species from Pesticides* (NRC 2013), and the most up to date scientific information on pesticide risk assessment framework (NMFS 2011a and NMFS 2013).

This risk assessment framework organizes the available information into three parts: problem formation, analysis of exposure and response, and risk characterization (USEPA 2004). The USEPA, U.S. Fish and Wildlife Service (USFWS), NMFS, and USDA have worked together to develop and implement a shared approach of an interim risk assessment framework, which focuses on a species centric weight-of-evidence approach rather than a chemical-centric approach (NRC 2013). Studies with listed species are preferable, however, when there is not a complete suite of information relating to effects on listed fish species, data from other surrogate species are used, recognizing and noting where there may be substantial interspecies

extrapolation. Specifically, rainbow trout are used as surrogates for salmonids and white sturgeon for green sturgeon. Even though there may be interspecies extrapolation, data from surrogates are considered the best available and were used in previous national pesticide consultations.

Exposure of the listed species to fluridone, penoxsulam, imazamox, and diquat applied as proposed, poses a low risk to fish mortality and reduction in fish growth and reproduction. Although the chronic toxicity data for rainbow trout indicated that the application of the four herbicides may have potential negative effects at higher application concentrations (*i.e.*, 1 to 2 orders of magnitude) than those proposed in the EDCP on Chinook or steelhead juveniles, the potential chronic effect is deemed insignificant or discountable considering the dissipation half-life and observed concentrations of the herbicides, the size and location of the treatment area, and juvenile migration (*e.g.*, Chinook salmon or steelhead) speed in the Delta.

The proposed use of the herbicides poses a low risk to the critical habitats designated for winter-run Chinook salmon, spring-run Chinook salmon, steelhead, and green sturgeon. The chronic toxicity data for macroinvertebrates (prey species) indicated that the application of the four herbicides may have potential negative effects at higher application concentrations (*i.e.*, 1 to 2 orders of magnitude) than those proposed in the EDCP. The potential effect of the four herbicides on macroinvertebrates is deemed insignificant or discountable considering the half-life of the herbicides, the relatively low toxicity application concentrations proposed for each herbicide, and the size of the treatment area. The use of imazamox and penoxsulam may negatively affect aquatic vascular plants, however the potential effect is deemed insignificant or discountable considering the dissipation half-life of the herbicides, recoverability of affected aquatic plants, and the size of a treatment area (200 and 100 acres, respectively). Although diquat poses the highest potential negative effect to aquatic vascular plants, the potential effects would be deemed insignificant or discountable considering the location (sloughs) and size of the treatment area (50 treatment acres or 0.07 percent of the total waterway area in the Delta), the dissipation half-life (48 h), and limited use of the herbicide within the action area.

Water quality

Decomposition of *Egeria densa* and other aquatic plants following application of herbicide products may reduce dissolved oxygen (DO) concentrations, and low DO can result in fish mortality or change their behavior such that they are vulnerable to predation. However, according to USDA and CDBW, application of Sonar (fluridone), Clearcaste (imazamox), Galleon (penoxsulam), and Reward (diquat) is not likely to reduce DO to a level unsafe for listed fish species. Since imazamox and penoxsulam are slow-acting systemic herbicides, they are not expected to result in reduced DO levels. USDA and CDBW have not observed, reported or provided data on reduced DO levels unsafe for listed species in freshwater habitats as a result of fluridone and diquat applications therefore, these herbicides are not expected to result in reduce DO levels.

Following the herbicide label requirements or the fish passage protocol regarding the number of treatments and time between treatments for each treatment site and herbicide application will minimize the potential for low DO as a result of herbicide applications. To further minimize the

effect of potential decreases in DO on listed species, USDA and CDBW will monitor DO and other water quality parameters (water temperature, turbidity, pH, salinity, specific conductance, water depth, and tide cycle) pre-and post-treatment for all EDCP treatments. Treatments will not be performed if DO levels are below the Basin Plan limits established by the Central Valley Regional Water Quality Control Board (ranging from 5 mg/L to 8 mg/L).

Physical Removal

The negative effects of diver handpicking, diver-assisted suction harvesting, and benthic barriers on listed fish species and their designated critical habitats are extremely unlikely to occur due to the nature and limited scope of the activities. Physical and mechanical removal may negatively affect the listed species and their critical habitats if and when they co-occur with the removal activities such as suction harvesting [*i.e.*, entrainment of fish from suction harvesting, impacts to macroinvertebrates (prey species), and green sturgeon migration]. However, the potential effects would be discountable based on the following information and mitigation measures:

- (1) Physical and mechanical removal methods will be used in limited locations when *Egeria densa* growth is concentrated near a boat ramp or where chemical treatment must be avoided, such as sites with many valley elderberry shrubs along the shoreline. The area where physical and mechanical removal may be used is estimated to be 40 acres or 0.06 percent of the action area;
- (2) If a field survey as described in the USDA's proposed action indicates that listed fish species are present or likely to be present, physical and mechanical removal of *Egeria densa* mats will not be conducted until such time as listed fish species are not likely to be present.

In summary, effects to salmonid and green surgeon survival and growth from short-term to fluridone, penoxsulam, imazamox, or diquat appear unlikely to occur. In addition, effects to salmonids from short-term exposure are not anticipated to impair fitness. Effects to critical habitat from short-term exposure are not expected to be significant to appreciably reduce the conservation values of the designated critical habitat. On the other hand, there would be beneficial effects of the proposed action to listed species and their critical habitat. The EDCP would improve the habitat condition and water quality in the action area by increasing the establishment of native vegetation, improving shallow-water habitat for native species, increasing DO levels, minimizing the potential for invasive weed recolonization, and increasing water velocity in the action area.

Conclusion

Based on this analysis, NMFS concurs with USDA and CDBW that the proposed *Egeria densa* Control Program is not likely to adversely affect federally listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, California Central Valley steelhead, and the Southern DPS of North American green sturgeon, or any of their designated critical habitats.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by USDA or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

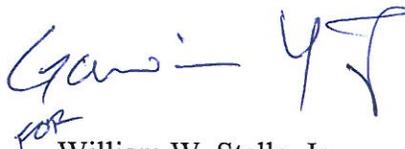
FISH AND WILDLIFE COORDINATION ACT

The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development (16 U.S.C. 661). The FWCA establishes a consultation requirement for Federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose, include navigation and drainage (16 U.S.C. 662(a)). Consistent with this consultation requirement, NMFS provides recommendations and comments to Federal action agencies for the purpose of conserving fish and wildlife resources. The FWCA allows the opportunity to offer recommendations for the conservation of species and habitats beyond those currently managed under the ESA and MSA. However, because the proposed project is designed to avoid environmental impacts to aquatic habitat within the action area, NMFS has no additional FWCA comments to provide. This concludes the FWCA portion of this consultation.

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. USDA also has the same responsibilities, and informal consultation offers action agencies an opportunity to address their conservation responsibilities under section 7(a)(1).

Please direct questions regarding this letter to Melanie Harrison at 707-575-1253 or Melanie.Harrison@noaa.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Gavin - YJ", with the word "FOR" written in smaller letters below it.

William W. Stelle, Jr.
Regional Administrator

cc: Sylvia Hunter, CDBW, 1 Capital Mall-Suite 410, Sacramento, CA 95814
Copy to file ARN 151422SWR2013SA00004

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