

(1993–30 I.R.B. 88). Therefore, proposed regulations §§ 31.6011(a)–3A, 31.6157–1 and 31.6302(c)–2A are hereby withdrawn.

List of Subjects in 26 CFR Part 31

Employment taxes, Income taxes, Penalties, Pensions, Railroad retirement, Reporting and recordkeeping requirements, Social security, Unemployment compensation.

Withdrawal of Notice of Proposed Rulemaking

Accordingly, under the authority of 26 U.S.C. 7805 and 26 U.S.C. 6302, proposed regulations §§ 31.6011(a)–3A, 31.6157–1, and 31.6302(c)–2A published in the **Federal Register** on May 13, 1993 (58 FR 28374) are withdrawn.

Robert E. Wenzel,

Deputy Commissioner of Internal Revenue.
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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AF67

Endangered and Threatened Wildlife and Plants; Withdrawal of Proposed Rule To Remove the Northern Populations of the Tidewater Goby From the List of Endangered and Threatened Wildlife

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule; withdrawal.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), withdraw the proposed rule, published in the **Federal Register** on June 24, 1999, to remove the northern populations of tidewater goby (*Eucyclogobius newberryi*) from the list of endangered and threatened wildlife and the concurrent proposal to keep listed as endangered a distinct population segment (DPS) of tidewater goby in Orange and San Diego Counties, CA. The tidewater goby will remain listed throughout its range as an endangered species under the Endangered Species Act of 1973, as amended (Act). Our withdrawal is based on comments and additional information received from the public, the scientific community, industry, other concerned governmental agencies, and other parties interested in the proposed delisting rule. We are convinced by the information provided

by the scientific community that our assessment of the importance of new tidewater goby populations and the recolonization ability of the tidewater goby in the proposed delisting rule were premature. We agree with a number of the commenters that it is prudent to wait and assess the persistence of these populations for a longer period of time. Withdrawing the delisting proposal for the northern populations of the tidewater goby makes the retention of a southern California DPS as endangered unnecessary, and therefore, we also withdraw our proposal to retain as listed a southern California DPS.

DATES: This action is made on December 9, 2002.

ADDRESSES: The supporting record for this withdrawal is available for inspection, by appointment, during normal business hours at our Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, CA 93003.

FOR FURTHER INFORMATION CONTACT: Carl Benz at the above address (telephone: 805–644–1766).

SUPPLEMENTARY INFORMATION:

Background

The tidewater goby (*Eucyclogobius newberryi*) is the only member of the genus *Eucyclogobius* in the family Gobiidae. The species was first described as *Gobius newberryi* by Girard in 1857. Gill (1862) studied Girard's specimens and created the genus *Eucyclogobius* for this fish species. The majority of scientists have accepted this classification (e.g., Bailey *et al.* 1970, Miller and Lea 1972, Hubbs *et al.* 1979, Eschmeyer *et al.* 1983, Robins *et al.* 1991). A few older works and Ginsburg (1945) placed the tidewater goby and the eight related eastern Pacific species into the genus *Lepidogobius*. This classification included the currently recognized genera *Lepidogobius*, *Clevelandia*, *Ilypnus*, *Quietula*, and *Eucyclogobius*.

Crabtree's (1985) allozyme (enzyme) work on tidewater gobies from 12 localities throughout the range identified fixed allelic (genetic) differences at the extreme northern and southern ends of the range, with the more centrally distributed populations more similar to one another. The results suggest a low level of gene movement between populations in the northern, central and southern parts of the range. However, the sites Crabtree sampled were widely separated geographically, and his results may not indicate gene flow on more local levels, as noted by Lafferty *et al.* (1999, cited in proposed delisting as in prep.).

More recently, David Jacobs (Department of Organismic Biology, Ecology and Evolution, University of California, Los Angeles, *in litt.*, 1998; Dawson *et al.* 2001) conducted an analysis of mitochondrial DNA (mtDNA) from tidewater goby populations ranging from Humboldt to San Diego Counties. Results suggested that San Diego tidewater gobies (*i.e.*, the southernmost tidewater goby populations) began diverging from the remainder of tidewater gobies more than 100,000 years ago and are therefore genetically distinct from individuals across the rest of the range.

The tidewater goby is a small elongate fish seldom exceeding 50 millimeters (mm), about 2 inches (in), standard length. This goby is characterized by large, dusky pectoral fins and a ventral sucker-like disk formed by the complete fusion of the pelvic fins. It is nearly transparent, with a mottled brownish upper surface, and often with spots or bars on dusky dorsal and anal fins. The mouth is large and oblique with the upper jaw extending nearly to the rear edge of the eye. The eyes are widely spaced. The tidewater goby is a short-lived species, apparently having an annual life cycle (Eschmeyer *et al.* 1983, Irwin and Soltz 1984, Swift *et al.* 1997).

The tidewater goby is endemic to California and restricted to coastal brackish water habitats. This species historically ranged from Tillas Slough (mouth of the Smith River, Del Norte County) near the Oregon border to Agua Hedionda Lagoon (northern San Diego County). Within this range, shallow brackish water habitats occur in two relatively distinct situations: (1) The upper edge of tidal bays, such as Tomales, Bolinas, and San Francisco Bays near the entrance of freshwater tributaries, and (2) the coastal lagoons formed at the mouths of small to large coastal rivers, streams, or seasonally wet canyons along the coast of California. Overall, the tidewater goby occupies a very small portion of the California coast (probably less than 5 percent) (C. Swift, Emeritus, Section of Fishes, Natural History Museum of Los Angeles County, CA, *in litt.* 1999).

Tidewater gobies can tolerate a wide range of salinities (from 0 to 60 parts per thousand (ppt)) and are frequently found throughout lagoons (Swift *et al.* 1989, 1997; Worcester 1992; Worcester and Lea 1996). However, tidewater gobies are often found in waters of low salinities (about 10 ppt) in the uppermost brackish zone of larger estuaries and coastal lagoons. In some cases, tidewater gobies may also be found in habitats that are essentially fresh with little or no tidal influence

(e.g., San Mateo Creek, Arroyo Laguna) (D. Holland, University of Southwestern Louisiana, Lafayette, *in litt.* 1999). Few well documented records of this species are known from marine environments outside of coastal lagoons and estuaries, but specimens have been collected from salinities up to 42 ppt (Swift *et al.* 1989) and 55 ppt (Swift and Holland 1998 as cited in D. Holland, *in litt.* 1999). Ocean seawater salinity is about 32 ppt. This goby can tolerate salinities up to 60 ppt for varying time periods (Swift *et al.* 1989, Worcester and Lea 1996).

Tidewater gobies usually are collected from water depths of less than 1 meter (m) (3 feet (ft)) and many localities are no deeper than this (Wang 1982, Irwin and Soltz 1984, Swenson 1995). They have been found, however, at water depths greater than 1 m (3 ft) (Worcester 1992, Lafferty and Altstatt 1995, Swift *et al.* 1997, Smith 1998). The lack of collections of tidewater gobies from depths greater than 1 m (3 ft) in lagoons and estuaries with deeper water may be due to the inadequacy of the sampling methods used, rather than the absence of tidewater gobies (Worcester 1992, Smith 1998).

Tidewater gobies may be preyed upon by native species, such as steelhead (*Oncorhynchus mykiss*) (Swift *et al.* 1989), and are documented prey items of prickly sculpin (*Cottus asper*), staghorn sculpin (*Leptocottus armatus*), and starry flounder (*Platichthys californicus*) (Swift *et al.* 1997). However, tidewater gobies were found in stomachs of only 6 percent of nearly 120 of the latter three species examined and comprised less than 20 percent by volume of the prey. Predation by the Sacramento perch (*Archoplites interruptus*) and tule perch (*Hysterocarpus traski*) may have prevented tidewater gobies from inhabiting the Sacramento-San Joaquin River delta (Swift *et al.* 1989). Nonnative predators, such as striped bass (*Morone saxatilis*), may have also contributed to the absence of tidewater gobies in the San Francisco Bay area (Swift *et al.* 1989, 1990). Although direct documentation of this is lacking, Shapalov and Taft (1954) and Wang (1982) noted predation by striped bass on tidewater goby.

Tidewater gobies may also be preyed upon by nonnative species other than striped bass, such as the African clawed frog (*Xenopus laevis*) (Lafferty and Page 1997), shimofuri goby (*Tridentiger bifasciatus*) (Swenson and Matern 1995), chameleon goby (*Tridentiger trigonocephalus*) (D. Holland, *in litt.* 1999), yellowfin goby (*Acanthogobius flavimanus*) (Wang 1984), centrarchid fish (Swift *et al.* 1989, 1997),

mosquitofish (*Gambusia affinis*) (D. Holland, *in litt.* 1999), and rainwater killifish (*Lucania parva*) (C. Swift, *in litt.* 1999). Chameleon and yellowfin gobies may also compete with tidewater gobies. Some of these fish, such as sunfish and black bass (*Centrarchidae*) are relatively widespread (M. Capelli, University of California, Santa Barbara, *in litt.* 1999). Predation and competition by nonnative species is further discussed in Factors C and E of the Summary of Factors Affecting the Species below.

Distinct Population Segments

Prior to publishing the proposed rule to delist the northern populations of the tidewater goby, we analyzed tidewater goby populations based on the joint National Marine Fisheries Service and U.S. Fish and Wildlife Service Policy Regarding the Recognition of Distinct Vertebrate Populations (61 FR 4722). Concurrently with the proposed delisting of the northern tidewater goby populations, we proposed a distinct population segment for the southern California portion of the tidewater goby range.

When determining whether a distinct vertebrate population segment could be treated as threatened or endangered under the Act, we consider three elements: discreteness, significance, and conservation status in relation to the standards for listing. Discreteness refers to the isolation of a population from other members of the species and is based on two criteria: (1) Marked separation from other populations of the same taxon resulting from physical, physiological, ecological, or behavioral factors, including genetic discontinuity, or (2) populations delimited by international boundaries. Significance is determined by the importance or contribution, or both, of a discrete population to the species throughout its range. The policy (61 FR 4722) lists four examples of factors that may be used to determine significance:

- (1) Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon;
- (2) Evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon;
- (3) Evidence that the discrete population segment represents the only known surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; and
- (4) Evidence that the discrete population segment differs markedly from other populations of the taxon in genetic characteristics.

If we determine that a population segment is both discrete and significant, we evaluate it for endangered or threatened status based on the Act's standards.

For the tidewater goby, we determined that the southern California portion of the range met the discreteness criterion based on (1) allozyme and mtDNA differences between the northern and southern portions of the tidewater goby range (Crabtree 1985; D. Jacobs, *in litt.* 1998) and (2) the geographic distance between the southern California tidewater gobies and the closest extant populations to the north (129 kilometers (km), 80 miles (mi)). Further, we determined that the southern California portion of the range was significant because it constitutes the most genetically divergent tidewater goby group (D. Jacobs, *in litt.* 1998). Its loss would result both in loss of a genetically unique tidewater goby group and in a reduction in range of tidewater gobies of approximately 129 km (80 mi). Upon analyzing the status of the tidewater goby in southern California, based on the Act's standards, we determined that it was appropriate to propose that the southern portion of the range remain listed as an endangered distinct population segment. Some of our rationale regarding status of the southern California populations is discussed further below in the Summary of Factors Affecting the Species. Our rationale for withdrawing the proposal to retain as listed a southern California DPS of tidewater goby is discussed below in the Summary of Comments and Recommendations and in the Finding and Withdrawal section.

Previous Federal Action

We first classified the tidewater goby as a Category 2 candidate species in 1982 (47 FR 58454). Category 2 candidate species were species for which information then in our possession indicated that proposing to list the species as endangered or threatened was possibly appropriate, but for which substantial data on biological vulnerability and threats were not currently known or on file to support proposed rules. We reclassified the tidewater goby as a Category 1 species in 1991 (56 FR 58804). Category 1 candidate species were species for which we had sufficient information on biological vulnerability and threats to support preparation of listing proposals. On October 24, 1990, we received a petition to list the tidewater goby as endangered. Our finding (signed March 22, 1991) that the requested action might be warranted was published in a proposal to list the tidewater goby as

endangered on December 11, 1992 (57 FR 58770). We determined endangered status for the tidewater goby throughout its entire range on February 4, 1994 (59 FR 5494). At that time, we found that critical habitat was not determinable because we lacked sufficient information to perform the economic analysis.

On June 24, 1999, we proposed to remove all of the tidewater goby populations north of Orange County, CA (64 FR 33816) from protection under the Act. Because we felt the southern portion of the range met the definition of a DPS and was subject to continuing threats, we concurrently proposed that it be retained as an endangered DPS when the northern portion of the range was delisted. We invited public comments and suggestions to this proposal in three comment periods. The first comment period ended August 23, 1999. Late in that comment period, we received new information on the potential marine dispersal of tidewater gobies, with additional information provided after the comment period closed. On February 15, 2000, we reopened the comment period (65 FR 7483) from February 15 to March 31, 2000, to request additional review of our proposal and to solicit the interpretations of appropriate and independent specialists and the public on the new information. On January 3, 2001 (66 FR 345), we reopened the comment period for a second time. We requested additional public and peer review comment from January 3 to February 2, 2001, on: (1) Our assertion that the original listing rule exaggerated the risk of extinction by overestimating the rate of local population extinction; (2) any information either supporting or contradicting the information in the proposed delisting rule that suggested the tidewater goby was not, in 1994 when it was listed, nor was currently, in danger of extinction due to a high rate of local extinctions; and (3) any new information that suggested a reasonable causal link between any of the threats, or combination of threats, and a high risk of extinction of the tidewater goby.

In addition to our proposal to delist the tidewater goby and the three public comment periods during 1999 to 2001, we designated critical habitat for the tidewater goby in 2000. The Natural Resources Defense Council, Inc., filed a lawsuit on September 18, 1998, in the United States District Court for the Central District of California, against the Service for our failure to designate critical habitat for the tidewater goby. The court ordered, on April 5, 1999, that we “publish a proposed critical habitat designation for the tidewater goby in

120 days’ (*Natural Resources Defense Council, Inc. v. U.S. Department of the Interior et al.*, CV 98–7596, C.D. Cal.). We proposed critical habitat for the tidewater goby on August 3, 1999 (64 FR 42250). The final rule designating critical habitat for the tidewater goby was published on November 20, 2000 (65 FR 69693). It includes 10 coastal stream segments in Orange and San Diego Counties, CA, totaling about 14.5 linear km (9 linear miles) of streams, including the stream channels and their associated wetlands, floodplains, and estuaries.

Tidewater Goby Proposed Delisting

In our proposed rule to delist the northern populations of the tidewater goby, we identified three major reasons for our proposed action: (1) There are more populations in the north than were known at the time of listing, (2) threats to those populations are less severe than previously believed, and (3) the tidewater goby has a greater ability than was known to recolonize sites from which it is temporarily absent. We believed that a number of populations had been recolonized following the end of the drought of the late 1980s and early 1990s and that the original listing of the tidewater goby was in error (66 FR 345). Commenters seriously disagreed with all three premises, but the most compelling information and arguments addressed premises 1 and 3. These commenters included a number of scientists with extensive experience with tidewater goby. The commenters’ opinions and analyses and additional information received during the comment periods form the basis of this withdrawal. They are discussed in detail below in the Summary of Comments and Recommendations and the Summary of Factors Affecting the Species.

Summary of Comments and Recommendations

We received a total of 45 written responses from individuals, agencies, or other entities during three public comment periods: June 24 to August 23, 1999 (64 FR 33816), February 15 to March 31, 2000 (65 FR 7483), and January 3 to February 2, 2001 (66 FR 345). Of those 45 written responses, 38 opposed delisting; two supported delisting all northern and southern populations; one supported delisting the northern populations; three requested the Service first delist all populations of the tidewater goby before proposing, if warranted, establishment of a southern distinct population segment; and, one commenter provided new information on the collection of two tidewater gobies

near Diablo Cove, south of Morro Bay, CA. Several commenters submitted multiple responses.

Peer Review

During the second and third comment periods, we requested peer review from independent scientists in compliance with our peer review policy (59 FR 34270; July 1, 1994). During the second comment period, one peer reviewer responded and supported the delisting. During the third comment period, we asked two fish biologists familiar with fish ecology, genetics, and the evolution of fish to review the proposed tidewater goby delisting and the designation of a southern California DPS. Both reviewers recommended that we keep the species listed as endangered and provided suggestions for our future review of this species’ population dynamics and population genetics. One concluded that the tidewater goby data used and our interpretations were insufficient to support the delisting. Their responses are included in the totals above, and their specific comments are addressed below along with the public comments.

We grouped comments of a similar nature into a single issue for response. Where applicable, we have revised this notice based on factual information provided by the commenters.

Issue 1: Procedural and Legal Compliance

The following comments and responses deal with compliance with the Act and other laws, regulations, and policies, and the public involvement in the delisting process.

Comment 1: One commenter felt that we had improperly proposed the tidewater goby DPS in the south. The commenter felt that the species must be delisted before a DPS may be designated. In addition, the commenter felt we violated the notice provisions of the Administrative Procedure Act (APA) by failing to give adequate notice of the listing of a DPS, suggesting that the proposal to retain the southern California portion of the range as a DPS was not adequately noticed for public comment.

Our Response: We believe we followed proper procedure in proposing the southern California tidewater goby DPS. Typical rulemaking procedures dictate that we propose an action, provide the public an opportunity to comment on the proposed action, and then make a final determination. The public was given the opportunity to comment on the proposed actions during three separate comment periods. Based on comments received from the public and from peer reviewers, we

have decided to withdraw the proposal to delist the northern populations of the tidewater goby and the concurrent proposal to retain the southern populations as a DPS.

Comment 2: One commenter referred to the designation of critical habitat for the tidewater goby and felt we violated section 4 of the Act by preceding a listing determination with a critical habitat designation. The commenter felt the outcome of this proposed delisting rule was predetermined by the critical habitat designation, violating the APA and the Endangered Species Act.

Our Response: The critical habitat designation the commenter refers to (65 FR 69693) is not a designation of critical habitat for a southern California DPS of the tidewater goby. The critical habitat designation is for the tidewater goby throughout its range. At the time of the designation, we believed the only areas essential to the conservation of the tidewater goby were in southern California. Therefore, we only designated critical habitat in southern California. We issued this designation of critical habitat as the result of a court order.

Comment 3: One commenter felt the proposed action was based on unpublished data which was not made available to the public for review.

Our Response: The commenter did not identify specific data that he felt were not available for public review. The proposed action was the subject of three public comment periods. All the supporting documentation, including comments received, were available for inspection at the Ventura Fish and Wildlife Office.

Comment 4: One commenter stated that we must establish objective recovery criteria before a species can be delisted. Several commenters suggested that we ignored the draft tidewater goby recovery plan in the formulation of the delisting proposal and that, in so doing, we contradicted the recommendations and recovery criteria of the draft plan. Others recommended retaining the endangered status of the tidewater goby and focusing our efforts on finalizing and implementing the draft tidewater goby recovery plan.

Our Response: Species can be delisted for any one of three reasons: (1) The species is extinct; (2) the species has recovered; or (3) the original data for listing, or the interpretation of those data, are in error (50 CFR 424.11(d)). In the first and third cases, we would not necessarily have recovery criteria by which to gauge delisting. Our delisting proposal for the tidewater goby was published because we felt that the original data or their interpretation were

in error (*see also* the notice reopening the comment period for the third time, 66 FR 345).

We wish to clarify that, while a preliminary draft recovery plan for the tidewater goby has been circulated among tidewater goby experts, we have not approved a draft recovery plan. The preliminary draft plan was never published and made available to the public for comment. Because they have not yet been published in an official draft recovery plan available for public comment, the recommendations and recovery criteria in the preliminary draft recovery plan are not our official guidance. We agree that the most appropriate course of action, given our withdrawal of this proposed delisting, is to proceed with the recovery planning process for the tidewater goby.

Comment 5: One commenter felt that monitoring for the tidewater goby is required if it is delisted.

Our Response: According to the Act, monitoring is required for a delisted species only if the species was delisted due to recovery. We had proposed delisting of the northern populations of the tidewater goby based on new information, not recovery. Furthermore, we have decided to withdraw the proposal to delist the northern populations.

Comment 6: One commenter suggested that the proposed delisting rule violates both the APA and the fifth amendment of the U.S. Constitution, by selectively imposing the regulatory burdens of the Endangered Species Act on certain landowners, without legal or scientific authority.

Our Response: We believe we were in compliance with the APA (*see also* responses to comments 1 through 3) throughout this rulemaking process. Furthermore, the regulations governing listing and delisting (50 CFR 424.11(b)) state that listing and delisting of a species as threatened or endangered are made “solely (emphasis added) on the basis of the best available scientific and commercial information regarding a species’ status, without reference to possible economic or other impacts of such a determination.”

Had we decided to finalize the proposal to retain a southern DPS as listed, the regulatory situation for landowners in southern California would not have changed because tidewater goby was already listed as endangered in southern California. However, we are withdrawing the proposal to retain a southern California DPS as listed, along with the withdrawal of the proposal to delist the northern populations.

Issue 2: Data Adequacy, Data Interpretation and Biological Concerns

The following comments and responses deal with issues related to the adequacy of the scientific information used for proposing the delisting and establishing the southern California distinct vertebrate population segment. We received comments that challenged our assessment of the available information at the time we proposed delisting the northern populations of the tidewater goby, and we received comments that introduced new information on the species. Comments were received on issues such as: the genetics of the northern and southern portions of the tidewater goby’s range (including the determination that southern California constitutes a DPS), the number of known tidewater goby populations and its relevance, metapopulation theory and population dynamics, natural recolonization by marine dispersal of tidewater goby larvae, salinity tolerance, and alternative interpretations of the data.

General Comments

Comment 7: A number of commenters suggested that (1) additional data or analyses are needed on some aspects of tidewater goby biology or threats (*e.g.*, 4 years of population data, encompassing only one dry-wet climate cycle, were collected since the listing), (2) we had misinterpreted or omitted existing scientific data (*e.g.*, misinterpretation of stringency of habitat requirements), (3) we failed to provide data, citations, or references to support numerous statements, (4) we relied on unpublished and unreviewed sources, and (5) we had ignored the professional opinions of tidewater goby experts. Most suggested that the entire species should remain listed. One commenter felt that the entire species should be delisted, in part because of Congress’s charge that we list species “sparingly.”

Our Response: We agree that additional data and analysis would be valuable, that there are alternate interpretations of the available data, and that additional supporting documentation (*i.e.*, references) would have strengthened our proposal. The arguments the commenters presented regarding the need for additional analysis, their presentation of alternative interpretations, and their call for additional documentation and reliance on published or peer reviewed sources have led us to withdraw the proposed rule to delist the northern populations of the tidewater goby. Withdrawing the proposed delisting makes retention of a southern DPS as

endangered unnecessary; therefore, we are also withdrawing the proposal to retain as listed the southern California portion of the range as an endangered DPS. Details of the commenters' arguments are presented throughout the remainder of the Summary of Comments and Recommendations and in the Summary of Factors Affecting the Species.

Comment 8: One peer reviewer felt that the information presented in our proposal to delist the tidewater goby populations north of Orange and San Diego Counties was thorough and well documented and that the conclusion to delist the northern populations appears justified.

Our Response: The bulk of the argument we received during the comment periods and the valid concerns raised regarding the meaning of the increased population levels identified indicates that withdrawing the proposal is appropriate at this time. Our reasoning is provided throughout the remainder of the Summary of Comments and Recommendations and in the Summary of Factors Affecting the Species.

Genetic Data and DPS Determination

Comment 9: A number of commenters questioned the adequacy of the available genetic data, suggesting that (1) Crabtree's (1985) allozyme work had various limitations, including geographically sporadic sampling and low sample sizes, and is not a thorough population genetic analysis, (2) at the time of the proposed delisting rule, the mtDNA analysis was incomplete, preliminary, and had not yet been published or peer reviewed, (3) the sample sizes of the mtDNA analysis were small (based on 2 to 4 fish per population), and (4) more study would be warranted. They were concerned that the best available genetic data for tidewater goby did not provide a credible scientific foundation for determining that the southern portion of the range constitutes a DPS. They suggested more study would allow analysis of larger sample sizes, additional tidewater goby populations and different genetic markers. One commenter was concerned by the use of mtDNA, which is maternally inherited; he advocated the use of biparentally inherited or paternally inherited markers. He also commented extensively on the use of mtDNA variation in these sorts of decision-making processes.

Our Response: We are required to use the best available scientific and commercial data in making our decisions. We used the best genetic data

that were available at the time of the proposed delisting rule. We have relied upon comments from scientists and the public to help us evaluate the sufficiency of these data, and based on their comments, we have decided to withdraw the proposal to delist the northern populations of the tidewater goby and the proposal to retain a southern California DPS.

Comment 10: A number of commenters questioned our interpretation of the recent genetic data of Jacobs (cited as D. Jacobs, *in litt.* 1998 in the proposed delisting). These commenters suggested that the data do not support a simple bifurcation into northern and southern portions of the range. The commenters felt we did not consider the differentiation Jacobs identified within the northern portion of the range, which suggests there are also genetically isolated units on a more local level. One commenter indicated that the tidewater goby is the "most genetically subdivided vertebrate with marine dispersal on the West Coast" and that its local genetic subdivision exceeds that which has been used to differentiate steelhead DPSs along coastal California. He felt the genetic evidence supports division of the tidewater goby's northern populations into four or five distinct population segments. Another commenter suggested that Crabtree's (1985) older results also indicated significant levels of genetic differentiation in tidewater goby.

Our Response: In our proposal to delist the northern portion of the tidewater goby range and retain the listing of the southern portion as a DPS, we did not include an attempt to identify all possible distinct population segments. We felt, at the time of the proposal, that the threats to the northern portion of the tidewater goby range did not warrant its continued listing and that genetic differences exhibited by tidewater gobies between the northern and southern portions of the range were large enough, along with the geographic gap in the range, to allow its distinction as a DPS. We did not intend to imply that the tidewater gobies in the northern portion of the range were genetically uniform. We understand that more complete genetic data have been published recently that underscore genetic differences within the northern portion of the range. Based on comments questioning our interpretation of the population data and our assumptions regarding recolonization we have decided to withdraw the proposal.

Comment 11: One commenter asked whether it is adequate to use only

molecular genetics data to designate a tidewater goby DPS. He felt that, while Jacobs mtDNA data (cited as D. Jacobs, *in litt.* 1998 in the proposed delisting) showed different haplotypes in the north than in the south, they give no indication that the divergence is of evolutionary significance. He suggested we have no actual evidence that the data reflect meaningful adaptive differentiation or the populations are "evolutionarily significant," noting that such judgements are subjective. He felt the data do not warrant a DPS determination and, instead of a DPS, he suggested the southern populations could simply be considered a management unit. Such a management unit could then be the subject of a management plan to maintain existing southern tidewater goby populations, precluding the need to list the tidewater goby.

Our Response: While we would like to have specific data reflecting adaptive differentiation and evolutionary significance of various portions of the tidewater goby range, we can only use information available when making our decisions. Based on our DPS policy, published on February 7, 1996 (61 FR 4722), we must evaluate whether the segment under consideration is discrete and significant. Genetic data can be used for either determination. However, genetic data are only one kind of data that are typically used; we also evaluate physical, physiological, ecological, or behavioral factors in making a determination. In the case of the tidewater goby, we used the best available genetic data (in this case, mtDNA data), along with information on the geographic distribution of the species (*i.e.*, we identified a 126 km (80 mi) geographic gap between the southern California tidewater gobies and the next closest extant population) to determine whether the southern portion of the range might constitute a DPS. However, given the comments of many scientists on the sufficiency of the available data and on our interpretation of them, we have decided to withdraw the proposal to delist the northern portion of the range and the proposal to retain as listed a southern California DPS. Because the species will remain listed, we cannot consider the southern portion of the range as a management unit that might preclude listing.

Comment 12: Several commenters suggested it was inappropriate to propose southern California as a DPS. One felt that, because all tidewater goby populations are characterized by some degree of reproductive isolation and because extensive natural gaps in its distribution occur, each population can

be viewed as discrete and significant under our DPS policy. Identification of only southern California as discrete and significant is inherently subjective and arbitrary. Another felt that we recognized, *de facto*, a second DPS comprised of the remaining northern populations from Los Angeles County to Oregon. A northern DPS is defined by default, with no specific reference to population structure, population dynamics, or genetic differences with this northern DPS. They suggested we created, by definition, a limited range and number of southern tidewater goby populations to support our conclusion that the southern DPS is endangered. Conversely, we created, again by definition, a northern tidewater goby population that is not endangered because of its much larger range and number of populations.

Our Response: We acknowledge that the proposed establishment of a southern DPS would create an area of multiple populations in the north that could be treated as a DPS. We believe our proposal was in compliance with our DPS policy (61 FR 4722). However, based on the arguments of numerous scientific commenters, we have decided to withdraw the proposal to delist the northern populations of the tidewater goby. This decision makes it unnecessary to pursue further the retention of an endangered DPS in southern California; therefore, we are withdrawing that proposal as well.

Number of Tidewater Goby Locations

Comment 13: A number of commenters noted that one of the main reasons for the proposed delisting was that tidewater gobies actually occur in more locations than known at the time of listing. One commenter stated that it was not uncommon to discover new populations once a species is listed because focused, systematic surveys are conducted. Most who commented on the discovery of new populations were concerned that we merely counted the number of extant tidewater goby populations, failing to evaluate the size, trend, threats, and viability of newly documented populations. They felt we considered all populations equally important, rather than evaluating whether the populations are small and marginal or large and likely to persist over longer time periods. Several commenters felt many of the recently documented tidewater goby populations were small and vulnerable to extirpation. One commenter considers only about 50 tidewater goby populations likely to persist for the long term. Others attempted similar calculations or noted they could not

understand (or disagreed with) our estimates of the number of extant populations and what percentage of tidewater goby populations had been extirpated (*i.e.*, our estimates were inconsistent with their data or knowledge of the tidewater goby's status). One commenter noted we had not attempted to take into account the possibility that un-sampled populations had been extirpated. One commenter noted that, although many "new populations" occur in a series of small estuaries in a mostly undeveloped area of Santa Barbara County and probably have a fairly high probability of persistence, this is not likely to be the general case in California where many tidewater goby populations are more isolated.

Our Response: We agree that not all populations contribute equally to the long-term persistence of a species. We relied heavily on the documentation of new populations as a rationale for our delisting proposal. One of the major reasons we have decided to withdraw this proposal is the convincing case made by numerous commenters that further information is needed to evaluate new locations.

Comment 14: One comment letter, received during the third comment period in early 2001, noted that a number of the "new" populations had not been surveyed for years and that some of those that were surveyed no longer contained tidewater goby populations. Consequently, they were concerned we are relying on outdated population data.

Our Response: At the time of the proposed delisting rule, we used the best available information to evaluate the presence or absence of new populations. Clearly, as time goes by, the situation can change. As noted above, we agree that further evaluation of the new locations is prudent.

Metapopulation Theory and Population Dynamics

Comment 15: Several commenters were concerned that the proposed delisting rule did not consider current understanding about metapopulation or "source-sink" dynamics in evaluating the likelihood of tidewater goby persistence. The long-term persistence of a metapopulation is complex, depending on specific habitat conditions, the spatial arrangement of habitats, environmental fluctuations, local population dynamics, dispersal probabilities, and other factors, many of which are site-specific. A number of commenters expressed their opinions that tidewater goby populations likely exhibit "source-sink" dynamics, where

not all local populations contribute to the overall persistence of the metapopulation. They suggested that larger populations contribute individuals to smaller sites that are not, by themselves, sustainable. One commenter estimated that less than 50 percent of tidewater goby populations can be considered "sources," and 30 to 50 percent are either extirpated or "sinks." Another stated that the additional twenty or so populations we reported since the 1994 listing are probably intermittent populations that could be sinks for the species as a whole, suggesting that the extinction risk is higher than we indicated in the proposed delisting rule. One commenter presented a very preliminary metapopulation viability analysis.

Our Response: Given the comments we received, we agree that we did not fully evaluate (1) metapopulation dynamics in the long-term persistence of local populations of tidewater gobies and (2) whether or not some local populations might behave as "sinks" for tidewater gobies from other populations. We agree with the commenters that such considerations are important in evaluating the likelihood of persistence of the tidewater goby. Comments on this topic contributed to our decision to withdraw the proposed delisting.

Comment 16: One peer reviewer noted that true metapopulations are exceedingly rare in nature and that other spatially structured models may be more appropriate for the tidewater goby. He would not advise using a "true" metapopulation model.

Our Response: We cannot evaluate whether the other commenters were referring to "true" metapopulations or whether they were using the terms more loosely, as often occurs. We agree that tidewater goby dynamics should probably be evaluated using the most appropriate of the more complex models that deal with population dynamics.

Natural Recolonization

Comment 17: Our delisting proposal relied heavily on our conclusion that the tidewater goby has a greater ability than previously thought to recolonize habitat from which it is temporarily absent. We felt that such ability was associated with an increased likelihood the species would persist. Many commenters disagreed with this interpretation, suggesting strongly that we had overestimated the tidewater goby's potential for recolonization. A number stated that (1) the tidewater goby's ability to recolonize habitats is limited, (2) it is not known to occur beyond 10 km (6 mi) from source populations, (3) the tidewater goby has

a weak swimming ability for long distances and against the currents of an estuarine system, and (4) because of prevailing currents, recolonization is most likely to occur to the south rather than the north. Many noted recolonization is much less likely in areas where populations are more widely separated, have geographic barriers, or where there is no nearby population to the north, as occurs in a number of areas. One commenter suggested that delisting the northern populations of tidewater goby is particularly problematic given the apparent one-way movement southward, going with the prevailing southerly ocean currents. In one study cited by a commenter, a high rate of extinction appeared to be related to a low rate of recolonization from outside sources. Another commenter noted that just because some recolonization occurs does not mean recolonization *rates* are sufficient to maintain a tidewater goby metapopulation. In contrast, one commenter suggested that some, perhaps many, of the new populations discovered following the drought were due to recolonization from adjacent areas where tidewater gobies remained, although he thought it would occur over a relatively short distance and might not always be possible (e.g., if a lagoon mouth does not open).

Our Response: Of the 45 total responses from commenters, 20 were identified with tidewater goby experts (multiple responses from some commenters) and a majority of these indicated that we overestimated the likelihood of natural recolonization of tidewater goby over any substantial distance. We are convinced by the commenters' arguments that additional time is needed to assess whether natural recolonization is as frequent as we assumed in the proposed delisting rule. Our delisting proposal relied heavily on our conclusion that recolonization was more frequent than previously thought. One of the major reasons we have decided to withdraw the proposal is the commenters' convincing case that an alternative interpretation may be more appropriate.

Comment 18: One commenter suggested that we consider tidewater goby recolonization in the context of a long-term tidewater goby recovery plan. One peer reviewer strongly recommended additional study to document if natural recolonization is actually occurring between localities where the tidewater goby exists. The peer reviewer and one commenter noted the delisting rule presented no alternatives to natural recolonization to explain presence/absence data. One

alternative to our recolonization hypothesis is that local populations periodically experience very low abundances under very unfavorable environmental conditions, and then, when conditions become favorable, repopulate through local reproduction (rather than from recolonization from another locality). Repopulation through local reproduction, along with little migration, could lead to losses of genetic diversity in local populations through bottleneck effects. The peer reviewer suggested approaches to evaluate whether this local reproduction hypothesis is correct.

Our Response: We agree that further study would be beneficial and that such a study would be appropriate as part of a tidewater goby recovery plan. In addition, we have added a brief discussion of susceptibility of small populations to extirpation from random demographic, environmental and/or genetic events to Factor E of the Summary of Factors Affecting the Species.

Comment 19: We stated that a lack of collection efforts at appropriate times may explain the absence of well authenticated records of the tidewater goby from marine environments outside of enclosed coastal lagoons and estuaries. If such collections had been made, we implied, tidewater gobies might have been found, providing evidence of marine movements consistent with natural recolonization. One commenter stated that this argument selectively employs absence of evidence. Another noted that some survey work has actually been done by Larry Allen of California State University, Northridge, and by James Allen, of Marine Environmental Consultants. The commenter noted that, based on their negative survey results, it is clear that marine incursions by tidewater gobies are very rare and involve very few fish.

Our Response: As noted above, there are other equally plausible interpretations of the data. Accordingly, we have reconsidered our rationale regarding recolonization.

Comment 20: Several commenters noted that a new research paper was published, since the time of the proposed delisting, that bears on the issue of recolonization as well as metapopulation dynamics.

Our Response: An unpublished draft of this manuscript was used in the preparation of the proposed delisting rule, cited as Lafferty *et al.* in prep. The work has now been published and is cited in this notice as Lafferty *et al.* 1999.

Salinity Tolerance

Comment 21: In the proposed delisting rule, we reasoned that the tidewater goby's tolerance of relatively high salinities indicated their potential for successful marine dispersal and recolonization of unoccupied habitat. Many commenters strongly disagreed with our interpretation. One peer reviewer noted that demonstrating laboratory survival in high salinities is not equivalent to showing migration through high salinity habitats is likely. He suggested that it is necessary to show documented movement of tidewater gobies from one estuary to another, either directly through tag and recapture studies, or indirectly through targeted genetic studies to show that recolonization occurs. Commenters noted that tidewater gobies prefer low salinities, that the species is most widespread and abundant in low salinity conditions, and that the species is much more restricted in saltier systems. Some gave site-specific examples to support their assertions. For example, Devereux Lagoon, which becomes hypersaline, no longer supports tidewater goby. In addition, the proposed delisting did not discuss long-term effects of high salinity on reproductive behavior, feeding or successful rearing of juveniles.

Our Response: As noted above, the commenters arguments regarding the likelihood of recolonization are compelling, and we are convinced that additional information is necessary to determine whether natural recolonization is as frequent as we assumed in the proposed delisting rule. We also agree that tolerance to high salinity does not necessarily indicate that natural recolonization occurs or is likely. Our proposed delisting relied heavily on our conclusion that recolonization was more frequent than previously thought. One of the major reasons we have decided to withdraw the proposal is the commenters' convincing case that an alternative conclusion may be more appropriate.

Morro Bay Collection

Comment 22: We reopened the comment period for the first time in response to new information that putative tidewater goby larvae had been collected in Morro Bay. The new information came from sampling done by Tenera Associates (G. McLaughlin, U.S. Fish and Wildlife Service, *in litt.* undated; Tenera, *in litt.* undated). We asked the public to provide input on how the collection might influence our interpretation of the frequency of marine dispersal by tidewater gobies. A

number of commenters responded, and none felt that the collection should change our interpretation of the tidewater goby's recolonization potential. One commenter suggested that, even if new information indicated substantial numbers of tidewater gobies were found in nearshore marine waters, it does not change the fact that their colonization of new habitats is an uncommon event that occurs close to the source population. Several noted that the collection was made within Morro Bay and not in the open water, where there were also sampling stations. One commenter stated that the appearance of tidewater goby larvae in Morro Bay does not indicate the species has recovered. In addition, several noted that the species identification was not certain. In fact, later genetic analysis showed the specimens were not tidewater gobies.

Our Response: Genetic data, mentioned by commenters, indicate that the specimens collected during sampling by Tenera Associates were not, in fact, tidewater gobies. Since the specimens were not tidewater gobies, the new collection data are not relevant to the frequency of marine dispersal by tidewater gobies. As noted above, we find that the commenters' arguments regarding the potential for tidewater goby recolonization provide a convincing case for more study. One of the major reasons we have decided to withdraw the proposal is the commenters' arguments that the proposed rule overstated the recolonization ability of the tidewater goby merit consideration.

Issue 3: Threats to the Tidewater Goby

The following comments and responses are related to our evaluation of threats to the tidewater goby. Some comments provided new information; where applicable, this new information was incorporated into this withdrawal notice.

Comment 23: Several commenters objected to our characterization of the tidewater goby's status relative to environmental regulations, coastal development, and habitat loss and modification north of Orange and San Diego Counties. They pointed out that we offered no evidence to support our contention that environmental regulations have appreciably reduced the potential for substantial habitat loss and modification. Rather, we inferred the conclusion from the relatively small number of known population extirpations since the implementation of major environmental programs in the early 1970s. In fact, the commenters note, the other environmental regulatory

mechanisms are most effective in conjunction with the Act, and some local agencies have already discounted the significance of potential effects to the tidewater goby based on the proposed delisting.

Our Response: We are required to use the best available scientific and commercial data in making our decisions. We are unaware of any studies demonstrating the adequacy or inadequacy of environmental regulations enacted since the 1970's. We agree that documentation of this would be useful. See additional discussion in Factor D below in the Summary of Factors Affecting the Species.

Comment 24: Several commenters felt that we did not adequately, or accurately, assess the current and future threats to the tidewater goby, including the threat to tidewater goby populations from coastal and upstream development projects, the threat of predation and competition by nonnative species, and the cumulative effects of threats in combination. One of these commenters noted that smaller wetlands, which can be "stepping stones" between larger tidewater goby habitats, are vulnerable to random events such as drought. On the other hand, larger wetlands tend to be susceptible to human activities.

Our Response: We agree that further analysis of the impacts of coastal and upstream development projects, the threat of predation and competition by nonnative species, and the cumulative effects of threats in combination is needed (see also comment 25 below).

Comment 25: A number of commenters stated that we were inconsistent in our evaluation of the northern versus southern portions of the tidewater goby range, suggesting that northern and southern populations of tidewater goby face the same threats from development, bridge and highway maintenance projects, dredging projects, artificial breaching, and inadequate regulatory mechanisms. Several commenters questioned our speculation that tidewater goby biology may differ in the southern portion of the range, a speculation used, in part, as a rationale for north-south distinctions in the rule. One commenter noted that we had failed to identify any substantive differences in population demographics, habitat variation, and response to disturbance between northern and southern tidewater gobies.

Our Response: We have addressed threats to the tidewater goby range-wide in the Summary of Factors Affecting the Species below. To the extent that threats remain, it appears that the distinctions between threats to the northern and southern portions of the tidewater goby

range may be less pronounced than we previously believed. Furthermore, there currently appears to be little evidence that northern and southern tidewater gobies differ in biology.

Comment 26: One commenter supporting the proposed delisting of tidewater goby asked whether tidewater gobies in the northern part of the range are threatened or endangered with extinction. He stated that whether or not the local populations in the northern range have limited gene flow among them does not address the basic question of whether the species, as a whole, is endangered. He suggested that new data obtained by Dr. Jacobs (presumably since the delisting proposal was published) only reveal insights to the genetic structure of the species' populations.

Our Response: We agree that Dr. Jacobs's data do not address the status of the tidewater goby in the north. As discussed below in the Summary of Factors Affecting the Species and in the other comments and responses in this section, we believe it is prudent to withdraw the proposal to delist the northern populations. Our decision is based primarily on scientific comments received during the three comment periods questioning the conclusions we drew based on the population increases. Specifically, the commenters felt we overemphasized the importance of the discovery of new tidewater goby populations and overstated the recolonization ability of the tidewater goby. The alternate interpretations of the data presented by the commenters have led us to believe that additional time is necessary to fully understand the dynamic of tidewater goby populations.

Comment 27: One commenter suggested that one wet-dry climate cycle is insufficient to evaluate the resiliency of tidewater goby populations.

Our Response: We agree that data from one wet and dry cycle is subject to multiple interpretations—none of which is conclusive. We discuss the effects of drought in Factor E of the Summary of Factors Affecting the Species.

Issue 4: Site-Specific Comments

The following comments and responses involve site-specific issues. Most site-specific issues were incorporated into the withdrawal, as appropriate. Two are addressed specifically below.

Comment 28: The Marine Corps Base, Camp Pendleton, provided comments that the proposed southern DPS exists in its entirety on Camp Pendleton and that it is not endangered. They provided specific information to support this contention, including an increase in

tidewater goby populations from three to eight and expansion or recolonization of all available tidewater goby habitat. They felt that (1) considering the southern DPS to be endangered is inconsistent with our 1995 Biological Opinion for Riparian and Estuarine/Beach Ecosystems on Camp Pendleton which set a recovery goal of six tidewater goby populations in six of the eight estuaries on the base, (2) we failed to consider and evaluate Camp Pendleton's natural resource management plans and efforts, and (3) the proposed southern DPS should be viewed as viable and self-sustaining, and not nearing extinction.

Our Response: There were 13 historic locations of tidewater goby in Orange and San Diego counties, of which 8 are intermittently extant on Camp Pendleton. All eight localities are relatively pristine coastal wetlands and are all crossed or just downstream of Interstate 5 and the coastal railway. They are, from north to south, San Mateo Creek, San Onofre Creek, Las Flores Creek, Hidden Creek, Aliso Creek, French Creek, Cocklebur Creek, and the Santa Margarita River.

Currently all locations are occupied on Camp Pendleton except French Creek and the Santa Margarita River. As recently as 1991, the number of occupied tidewater goby localities was only three (Swift and Holland 1998, D. Holland, *in litt.* 1999). Based on survey information, San Onofre Lagoon and Los Flores have been consistently occupied since 1987 (Camp Pendleton INRMP, 2001).

In 1995, the Service issued a programmatic biological opinion on the "Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on Marine Corps Base, Camp Pendleton," including an Estuarine/Beach Ecosystems Conservation Plan (U.S. Fish and Wildlife Service, Biological Opinion 1-6-95-F 02, 1995). The reasonable and prudent measures of the biological opinion require the Marines to adopt and implement the Estuarine/Beach Ecosystem Conservation Plan.

The Estuarine/Beach Ecosystem Conservation Plan is structured to minimize the effects to listed species resulting from potential impacts associated with ongoing and future training, maintenance, recreation, and construction activities. The Marines have the authority to carry out the measures in the plan, and because the terms and conditions are mandatory, there are assurances that the Conservation Plan will be implemented. While the Conservation Plan focuses primarily on avian species and does

address the tidewater goby generally, it does not contain specific biological objectives, recovery criteria, or recovery goals for the tidewater goby. While an internal draft recovery plan for the tidewater goby had been informally released in 1996, we have not formalized and published a draft or final recovery plan for the species that establishes recovery criteria and goals for delisting.

In 2001, Camp Pendleton completed an Integrated Natural Resource Management Plan (INRMP) for the Base that addresses the tidewater goby. However, the INRMP, does not provide conservation and management measures for the tidewater goby beyond those indicated in the Conservation Plan.

In addition, other conditions related to the recent drought conditions in southern California and the presence of non-native predators have threatened tidewater goby populations. For example, Hidden Creek appears to have perennial water flow but may become so hypersaline in a severe drought as to be unsuitable for any fish species (Swift and Holland 1998). Aliso Creek, French Creek, and Cocklebur Creek are all relatively ephemeral and have not supported tidewater gobies in times of drought. The Santa Margarita River seemed to contain a large stable population until 1991, but tidewater gobies disappeared in 1991, shortly after the nonnative yellowfin goby became abundant in the estuary.

Overall, taking into consideration the measures in the Conservation Plan for the tidewater goby, the continued threats to the species and its habitat, and the species' intermittent occupancy in the drainages on Camp Pendleton as discussed above, we believe that the populations of tidewater goby on Camp Pendleton still require the protection afforded it under the Act.

Comment 29: The proposed delisting rule overstates the impact of the Foothill (South) Transportation Corridor.

Our Response: The proposed "CP alignment" of the Foothill Transportation Corridor South (FTCS), if constructed, has the potential to negatively impact the tidewater goby, specifically in San Mateo and San Onofre Creeks (Michael Brandman and Associates 1998). The lagoons at the mouth of San Mateo and San Onofre Creeks are occupied by tidewater gobies, and these two lagoons are capable of supporting large tidewater goby populations from several thousand to approximately 70,000 tidewater gobies (Swift and Holland 1998). These two populations, along with Las Flores Creek, are the largest and most persistent in the region and are thought

to serve as source populations for dispersal into the ephemeral estuaries and streams in the area. Thus, these populations are important to the recovery of the tidewater goby.

A preliminary investigation of the impacts to tidewater gobies from the CP alignment found that adverse impacts would be less than significant after mitigation (Michael Brandman and Associates 1998). However, mitigation proposals have not been included as part of the project description, and the alternatives for this project are still being developed for an Environmental Impact Statement. Absent complete mitigation being incorporated into the project, the FTCS CP alignment may have both short-term and long-term impacts to tidewater gobies in the San Mateo Creek and San Onofre Creek drainage and accompanying watershed (Michael Brandman and Associates 1998). Short-term impacts could include mortality and temporary loss of habitat for breeding, feeding, and sheltering due to blockage or diversion of water flow, increased siltation from the required earthen cut and fill, and the disturbance of low oxygen sediments. Long-term impacts could include: the alteration of the hydrologic regime, primarily in changes to flow regimes, temperature patterns, and sediment movement characteristics of the streams; loss of habitat for breeding, feeding, and sheltering due to siltation; and deterioration in water quality of the streams from the input of heavy metals and other contaminants. These types of changes to the abiotic elements of a stream are often associated with corresponding changes to the ichthyofauna (fish species assemblage within a region). Generally, this kind of disturbance results in an increase of exotic fish species to the detriment of the indigenous (native) ichthyofauna (Moyle and Light 1996). Currently, projects in coastal streams are regulated by the California Environmental Quality Act (CEQA), the State of California's streambed alteration permit program, the Army Corps of Engineers 404 permits and California's delegated authorities under the Clean Water Act which regulates stormwater runoff from highways and during construction. While such effects as are enumerated are possible, they may be remediated in whole or in part by these regulatory controls prior to project approval and construction.

Summary of Factors Affecting the Species

Section 4(a)(1) of the Act and regulations implementing the listing provisions of the Act (50 CFR part 424)

set forth the procedures for adding species to the Federal list of threatened and endangered species. We must consider the five factors described in section 4(a)(1) of the Act when determining whether any species is an endangered or threatened species. These factors and their application to our decision to withdraw the proposal to delist the tidewater goby are described below:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Coastal development and habitat modification/loss. The final rule listing the tidewater goby indicated that coastal development projects that result in the loss of coastal saltmarsh habitat were the major threat adversely affecting the tidewater goby. Our delisting proposal, on the other hand, stated that north of Orange and San Diego Counties such projects, including dredging of waterways for navigation and harbors and road construction that severed the connections of marshes with the Pacific Ocean, were responsible for *historical* loss of tidewater goby populations. Having reevaluated the number of tidewater goby extirpations resulting from coastal development and habitat modification and loss, we stated that the potential for the significant habitat loss and modification that occurred historically has been substantially reduced in the northern portion of the tidewater goby range. We postulated that this was largely due to the implementation of key environmental regulation required by the Clean Water Act, Coastal Zone Management Act, and related California environmental statutes. We cited only five permanent extirpations resulting from destruction or modification of habitat since the initial promulgation of environmental regulations in the early 1970s.

In Orange and San Diego Counties, we identified several recent human activities that may have adversely affected the tidewater goby. We specifically discussed activities at San Onofre Creek Lagoon and San Mateo Creek Lagoon. We thought both of these locations might be important sources of dispersing tidewater gobies, appearing to be two of the three most stable populations in the area. We felt that population losses or reductions of the San Onofre and San Mateo tidewater goby populations were very serious and illustrated ongoing adverse impacts of earthmoving activities in and around creeks and lagoons in the southern portion of the tidewater goby range.

As noted above in the Summary of Comments and Recommendations, several commenters objected to our

characterization of the tidewater goby's status relative to coastal development and habitat loss and modification north of Orange and San Diego Counties. They state that we inferred that environmental regulations have substantially reduced the potential for habitat loss and modification from the relatively small number of known population extirpations since the implementation of major environmental programs in the early 1970s (J. Buse, Environmental Defense Center, *in litt.* 1999, M. Capelli, *in litt.* 1999). Review of pending development projects within the California Coastal Zone indicates that development pressure continues (M. Capelli, *in litt.* 1999) and economic signs point to dramatic human population increases in California in the near future, greatly increasing infrastructure needs that could impact coastal watersheds and drainages (Swift, Emeritus, Section of Fishes, Natural History Museum of Los Angeles County, California, *in litt.* 2001). Some counties, such as San Luis Obispo, are expected to expand by 175 percent by 2010, potentially having significant impacts on tidewater goby habitat (S. Christie, Environmental Center of San Luis Obispo, *in litt.* 1999). Human-made impacts, combined with the effects of drought, could lead to a situation in which a marginal tidewater goby population may not recover from the drought as we would predict based on their life history (Hight, California Department of Fish and Game, *in litt.* 2001). The tidewater goby's estuarine and coastal lagoon habitats are potentially the most highly altered aquatic environments in the state. They are threatened by the impacts from coastal development projects and urban development, and these threats are likely to continue into the near future. Research has shown a pronounced trend toward extirpation when a cyclic species encounters drastic anthropogenic disturbance (M. Marchetti, California State University, Chico, *in litt.* 2001).

Water diversions and groundwater overdrafting. The final listing rule stated that upstream water diversions and groundwater overdrafting may adversely affect the tidewater goby by altering downstream flows. This alteration would diminish the extent of marsh habitats that historically occurred at the mouths of most rivers and creeks and potentially affect the species' breeding and foraging activities. The rule further suggested that alterations of flows upstream of coastal lagoons resulting in changes in downstream salinity regimes might affect the tidewater goby due to

its presumed narrow salinity tolerances. The delisting proposal, on the other hand, noted that the San Antonio Creek in Santa Barbara County, which was used as an example of the adverse effects of groundwater overdrafting, was occupied by tidewater gobies in 1995 (but C. Swift, *in litt.* 1999 suggests the proposed delisting rule was in error and should have referred to Santa Rosa Creek).

Scientists who commented on the proposed delisting pointed out that extirpation is not the only effect we ought to be concerned about. Effects short of complete extirpation should be considered as well. For example, population size and stability are important considerations, as is the combination of human influences and natural perturbations (M. Capelli, *in litt.* 1999). In fact, the final listing rule also noted that negative impacts of water diversions and alterations of flows may extend to breeding and foraging activities.

The delisting proposal also included a lengthy discussion of the salinity tolerances of tidewater gobies, suggesting that the tidewater goby appears tolerant of a broad range of salinity conditions and implying, therefore, that salinity changes due to upstream flow alterations would not have adverse effects on the tidewater gobies. Some scientists commenting on the proposed delisting suggested that we confused salinity tolerance with the natural preference of tidewater gobies for mildly brackish water (M. Capelli, *in litt.* 1999, T. Frink, American Fisheries Society, *in litt.* 1999, R. Swenson, The Nature Conservancy, *in litt.* 1999). Most researchers have found that the species is most widespread and abundant in low salinity conditions, and much more restricted in saltier systems (T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999). The proposed delisting rule cites only simple extreme saline water experiments; one commenter questioned the long-term effects of saline conditions on critical reproductive behavior, feeding, or the successful rearing of juveniles (M. Capelli, *in litt.* 1999). Furthermore, the response to salinity of benthic invertebrates on which tidewater gobies feed may also be critical in evaluating the long-term response of tidewater gobies to high salinities (T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999).

Channelization. The final listing rule noted that channelization of rivers inhabited by the tidewater goby threatens the species because of the scouring effects of high winter flows in the restricted channels and the lack of protective habitat. The delisting

proposal stated that, with the exception of Waddell Creek, Santa Cruz County, we were unable to identify population extirpation due to channelization and that in Waddell Creek, tidewater gobies were reestablished in 1991.

Some scientists who commented on the proposed delisting disagreed with both our characterization of the threat from channelization and our characterization of the situation at Waddell Creek. The effect of channelization is not limited to the increased probability of tidewater gobies being swept into marine environments and to lack of refugia but also includes direct loss of habitat area and increased rate of urban runoff (M. Capelli, *in litt.* 1999). Additionally, the significance of reestablishment in Waddell Creek is questionable because it has not been demonstrated that tidewater gobies were extirpated there or whether instead they were depressed to the point of not being detectable (M. Capelli, *in litt.* 1999) and because they likely have been eliminated again from the lagoon (C. Swift, *in litt.* 1999). Finally, one scientist pointed out that, even if tidewater gobies had recolonized, it is not appropriate to extrapolate that finding to all localities (M. Capelli, *in litt.* 1999).

Cattle and feral pigs. The final listing rule identified cattle grazing and feral pig activity as threats to the tidewater goby, stating that these activities have resulted in increased sedimentation of coastal lagoons and riparian habitats, removal of vegetative cover, increased ambient water temperatures, and elimination of plunge pools and collapsed undercut banks used by tidewater gobies. The proposed delisting rule, on the other hand, argued that many lagoons receiving agricultural and sewage effluents are occupied by tidewater gobies and they are the most abundant fish species present (e.g., in Santa Barbara County lagoons (Ambrose *et al.* 1993)). Tidewater gobies were also found in high numbers in areas with low levels of dissolved oxygen (0.2–1.7 mg/l) (Worcester 1992, Swift *et al.* 1997). We concluded, therefore, that the tidewater goby appears to be tolerant of agricultural and sewage effluents as well as a wide range of dissolved oxygen levels.

Commenters noted that sedimentation and erosion has also been caused by vineyard conversions in some areas (P. Ashley, *in litt.* 1999; S. Christie, *in litt.* 1999). Scientists who commented on the proposal stated that our analysis is insufficient because we have not assessed how many populations persist when subject to siltation and topsoil runoff (D. Holland, *in litt.* 1999).

Presence of tidewater gobies in a particular situation does not mean that tidewater gobies are doing well (P. Ashley, biologist, *in litt.* 1999; C. Swift, *in litt.* 1999). They believe that despite tidewater gobies being present, and even abundant, siltation and topsoil runoff and waste discharge may still influence tidewater goby declines and future viability of tidewater gobies and may be important because of other potential effects (e.g., effects of waste discharges on tidewater goby food supply) (M. Capelli, *in litt.* 1999).

Numbers of populations/resiliency/recolonization. In the final listing rule, we stated that extirpated localities had left remaining tidewater goby populations so widely separated that we felt recolonization was unlikely. Many lagoons inhabited by tidewater gobies were small and widely separated. According to Swift *et al.* (1990), only eight extant localities, all north of San Francisco Bay, contained populations considered both large enough and free enough from habitat degradation to be safe for the immediate future. The remaining lagoons were so small or modified that tidewater goby populations were restricted in distribution and vulnerable to elimination (Swift *et al.* 1989, 1990).

In the proposed delisting rule, we stated that new information and analyses showed that the tidewater goby is very well adapted to the climatically dynamic system in which it evolved and that intermittent occupancy of some sites was a normal aspect of the species biology (Swift *et al.* 1994, 1997; Lafferty *et al.* 1999 (cited in proposed delisting as in prep.)). We noted that at the end of the 1987–1992 drought at least 14 populations thought to be extirpated were found to be extant. In addition to these 14 sites, following a return to normal or above average rainfall, tidewater gobies were found in approximately 20 other sites. Our interpretation of this information was that recolonization is possible, and in fact, is a normal process following habitat variation due to climatic fluctuation (Swift *et al.* 1994, 1997; Lafferty *et al.* 1999 (cited in proposed delisting as in prep.)). We determined that the continued survival of tidewater goby populations, after the drought of the late 1980s and early 1990s, indicated we were incorrect in concluding that most tidewater goby populations were extremely vulnerable to extirpation. However, based on the comments we received, we believe it is appropriate to review our interpretations of (1) the meaning of additional tidewater goby locations, and (2) the likelihood of tidewater gobies

recolonizing temporarily unoccupied sites. These two premises were fundamental to our rationale to propose delisting the northern populations of the tidewater goby; each is discussed briefly below.

The commenters' arguments that a simple enumeration of locations where tidewater gobies have been identified is not sufficient to evaluate the vulnerability of this species have merit. Information on population sizes, trends and/or viabilities is needed to accurately assess whether the species or individual populations are likely to persist (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999; J. Smith, San Jose State University, San Jose, California, *in litt.* 1999; C. Swift, *in litt.* 2001). A number of scientists noted that not all local tidewater goby populations contribute equally to the overall persistence of the species. The additional populations reported since the 1994 listing are likely to be sink populations, smaller sites that receive individuals from larger sites, and are not by themselves sustainable (C. Swift, *in litt.* 1999; R. Swenson, The Nature Conservancy, *in litt.* 2001). Therefore, evaluating the vulnerability of the tidewater goby will likely require an understanding of the interaction among populations or a demonstration of their persistence or repeat recolonization (*i.e.*, metapopulation structure, source-sink dynamics, other spatial structure) (R. Ambrose, University of California, Los Angeles, *in litt.* 1999; C. Swift, *in litt.* 1999, 2001; R. Swenson, *in litt.* 2001). As noted by Richard Ambrose (*in litt.* 1999), the long-term persistence of a metapopulation depends on numerous factors, including specific habitat conditions, the spatial arrangement of habitats, environmental fluctuations, local population dynamics, dispersal probabilities, and other site-specific factors. In the proposed delisting, we did not evaluate the likelihood of tidewater goby persistence in terms of this complexity, and we feel that it is worthy of further consideration.

A second reason we proposed to delist the northern populations of the tidewater goby was because we felt that the tidewater goby's ability to recolonize temporarily unoccupied habitat was greater than we had previously thought. We felt that such ability was associated with an increased likelihood that the species would persist. As evidence that recolonization occurred, we noted the reappearance of tidewater gobies after cessation of the drought and tidewater goby salinity tolerance. However, recolonization is not the only possible explanation for the reappearance of tidewater gobies after the drought (e.g.,

M. Capelli, *in litt.* 1999; T. Turner, University of New Mexico, *in litt.* 2001). In addition, salinity tolerance, particularly as determined in laboratory experiments, does not necessarily indicate that tidewater gobies will travel through the marine environment to recolonize temporarily unoccupied sites (M. Capelli, *in litt.* 1999; T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999; T. Turner, *in litt.* 2001). We believe, based on the evidence presented by the commenters, that the tidewater goby's potential for recolonization may be lower than we believed at the time of the proposed delisting rule (*see also* comments 15 to 20 above). Information presented by the commenters suggests the tidewater goby's ability to recolonize is very limited, perhaps no more than 10 km (6 mi) (T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999; Swift *et al.* 1997 as cited in D. Holland, *in litt.* 1999; Lafferty *et al.* 1999; C. Swift, *in litt.* 1999). Recolonization appears to be much less likely where populations are more widely separated, have geographic barriers, or where there is no nearby population to the north (T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999). Given this possible interpretation, we feel the tidewater goby may be more vulnerable than we thought at the time of the delisting proposal. We believe it is prudent to evaluate its vulnerability in more detail before delisting any portion of the species.

Artificial lagoon breaching. Although not discussed in the final listing rule, the proposed delisting also discussed artificial lagoon breaching during the dry season as a potential threat to the tidewater goby. We considered significant decreases in water level, exposure of tidewater goby breeding burrows and bottom habitat, and increased salinity resulting from breaching as possible threats to the tidewater goby from breaching during the dry season. However, we noted, in the northern portion of the tidewater goby range, the species continues to persist at numerous locations where unseasonable breaching has occurred (Lafferty 1995, Swenson 1995, Lafferty and Alstatt 1995, Heasley *et al.* 1997; D. W. Alley, *in litt.* 1998). Because we had no records of breaching-related extirpations, we concluded that breaching does not pose a significant threat to the northern populations of the species. In the southern portion of the range, we were aware of adverse effects on tidewater goby from an artificial breaching at San Onofre Creek Lagoon.

The argument we presented in the proposed delisting rule with respect to unseasonable breaching was couched entirely in terms of extirpation (M.

Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999; K. Lafferty, U.S. Geological Survey and University of California, Santa Barbara, *in litt.* 1999). Commenters noted a significant threat to tidewater goby populations via loss of individuals, a significant portion of a population, and/or changes in the quality or quantity of habitat may well occur during breaching (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999; K. Lafferty, *in litt.* 1999). Commenters opined that repeated disturbance from breaching events could also jeopardize food supplies for tidewater gobies in lagoon habitats (Swenson 1999 as cited in R. Swenson, *in litt.* 1999). Although breaching can reduce population densities and alter hydrology in ways that may be detrimental to tidewater gobies, several populations manage to persist with regular breaching and it is not possible, given the information available, to determine when and where breaching will lead to extirpation (K. Lafferty, *in litt.* 1999).

One reason we proposed delisting the northern populations of tidewater goby was that we felt threats to the populations were less severe than we believed at the time of listing. Some commenters provided information suggesting that there is cause for concern about the impacts of coastal development, habitat modification and loss, water diversions, channelization, cattle and pigs, and artificial lagoon breaching on tidewater goby populations throughout its range. As noted below in Factors C and E, such impacts may also exacerbate threats from other sources (e.g., predation by non-native fish). In light of these considerations, we believe the prudent course of action is to withdraw the proposed delisting.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Overutilization is not known to be applicable; there is no change in this factor since the delisting proposal in 1999.

C. Disease or predation. Disease was not identified as a threat in the final listing rule or the delisting proposal, nor is it known to be a threat at this time.

Trematodes. The proposed delisting rule noted that the digenean trematode (a flatworm or fluke) *Cryptocotyle lingua* could have been a factor in the apparent population decline of tidewater gobies in Pescadero Lagoon in 1992 and 1993 (Swenson 1995). The trematode species also had been reported from Corcoran (Rodeo) Lagoon in Santa Cruz County (Swift *et al.* 1989), where we felt it did not affect tidewater goby populations. In fact, there has been no appropriate investigation to

determine whether trematodes are a significant source of mortality in tidewater gobies. However, they are known to be an important mortality source in other fish species. For example, trematodes can cause up to a 30-fold increase in killifish mortality (Lafferty and Morris 1996 as cited in K. Lafferty, *in litt.* 1999).

Nonnative predators. The final listing rule stated that introduced predators, especially centrarchid fish, may have contributed to the elimination of the tidewater goby from several localities in California (Swift *et al.* 1989). We noted that the present day absence of the tidewater goby from the Sacramento-San Joaquin River delta and San Francisco Bay area may well be explained by the presence of introduced predators such as striped bass and native predators including Sacramento perch (Swift *et al.* 1989, 1990) (*see also* Background section). At that time, two recent disappearances of tidewater gobies were also likely due to the presence of exotic largemouth bass (*Micropterus salmoides*) and green sunfish (*Lepomis cyanellus*), in Old Creek of San Luis Obispo County and San Onofre Creek of San Diego County, respectively (Swift *et al.* 1989). Additionally, we were concerned that direct predation on adults, larvae, or eggs by other nonnative predators, such as crayfish (*Cambarus* spp.) and mosquitofish, might threaten the tidewater goby.

In the delisting proposal, we asserted that tidewater goby populations north of Orange and San Diego Counties were not particularly vulnerable to these introduced fish. Centrarchid fish were known, at the time, to exist at many sites inhabited by large populations of tidewater gobies (e.g., Santa Clara River, Las Pulgas Creek, San Mateo Creek). The threat of tidewater goby extirpation throughout its habitat as a result of predation by these nonnatives was thought to be minimal because (1) tidewater goby populations were large and able to repopulate from adjacent streams and (2) tidewater gobies have a wider range of salinity tolerance than the nonnative fish do. Although nonnative fish consume tidewater gobies, we felt the predation was not a serious threat. We also noted that tidewater gobies occur in large numbers in at least one location (Santa Clara River) occupied by African clawed frogs, which also feed on tidewater gobies. We implied that the co-occurrence of both African frogs and nonnative fish with tidewater gobies meant that predation was not a threat.

In contrast, we felt that nonnative predation could be a threat to tidewater gobies in Orange and San Diego

Counties when combined with other factors such as habitat disturbance. We noted that nonnative predators could prevent or contribute to significant reductions in dispersal and recolonization of sites in southern California. Nonnative fish were thought to have played a role in population losses or declines in San Onofre Creek and the Santa Margarita River. In addition, yellowfin goby was, by that time, established in most lagoons inhabited by tidewater gobies in Orange and San Diego Counties. We received no comments that allay our concerns that ongoing impacts continue to endanger the tidewater goby in southern California.

Based on comments and new information we received, it appears that nonnative predators are likely to be a threat to tidewater gobies throughout their range. We implied in the proposed delisting that the presence of tidewater gobies with nonnative species (*i.e.*, co-occurrence) indicated that predation by nonnatives was not a threat. In fact, co-occurrence does not necessarily suggest that long-term co-existence is likely (K. Lafferty, *in litt.* 1999; C. Swift, *in litt.* 1999). Although direct evidence that introductions of nonnatives led to extirpations of tidewater gobies is lacking, tidewater gobies did disappear from several localities soon after centrarchid fish were introduced (Swift *et al.* 1989, 1994; Rathbun *et al.* 1991). Commenters noted specific examples of situations where predation by nonnatives may have negatively affected tidewater goby populations (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999; C. Swift, *in litt.* 1999). In the Santa Ynez River system, tidewater gobies accounted for 61 percent of the prey volume of 55 percent (10 of 18) of the juvenile largemouth bass sampled (Swift *et al.* 1997, M. Capelli, *in litt.* 1999). The decline and subsequent recovery of the tidewater goby population in Las Pulgas Creek closely tracked the absence of green sunfish from the lagoon in this system (Swift and Holland 1998 as cited in D. Holland, *in litt.* 1999). The elimination of tidewater gobies from the Santa Margarita may have been due to the combined influence of nonnative species and decreasing habitat available for the tidewater goby (Swift and Holland 1998 as cited in D. Holland, *in litt.* 1999). Largemouth bass in Old Creek of San Luis Obispo County are likely responsible for the elimination and prevention of re-establishment of tidewater gobies there (D. Holland, *in litt.* 1999). The evidence suggests that nonnative fish are often introduced to tidewater goby habitats, prey on

tidewater gobies, and in some documented cases, may lead to the extirpation of tidewater gobies. This evidence, though indirect, suggests that some nonnative predators can have negative impacts on tidewater gobies, including extirpation (K. Lafferty, *in litt.* 1999). In addition, predation by nonnatives may have negative effects short of extirpation, reducing tidewater goby population sizes and, thereby, rendering populations more vulnerable over the long-term to extirpation as a result of natural perturbations of habitat conditions at the site (M. Capelli, *in litt.* 1999).

Some commenters believed that tidewater gobies may have limited ability to repopulate from adjacent streams. We suggested that the ability to repopulate, along with sufficiently large population sizes, made predation by nonnatives a minimal threat. The commenters questioned how many tidewater goby populations might be considered large and how population fluctuations might affect vulnerability (D. Holland, *in litt.* 1999, *see also* comments 13 and 15). In addition, as noted elsewhere (*see* comments 17 to 22 and Factor A), the dispersal ability of tidewater gobies may be very limited, making repopulation of extirpated sites problematic (D. Holland, *in litt.* 1999).

Our argument that tidewater gobies are not threatened by nonnatives because tidewater gobies have a wider salinity tolerance was not supported by scientists commenting on the proposal. The commenters assert that many of the species known or thought to prey on tidewater goby have a wide range of salinity tolerance, including striped bass, chameleon gobies, yellowfin gobies and shimmuri gobies (D. Holland, *in litt.* 1999). Additionally, some commenters asserted that the habitat of the tidewater goby may be essentially freshwater for part, or even much, of the year (Swift and Holland 1998 as cited in D. Holland, *in litt.* 1999), making tidewater gobies vulnerable even to nonnative species with limited salinity tolerance, including largemouth bass, green sunfish, African clawed frogs, and others (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999).

Finally, commenters speculated that ranges of current nonnative species may expand (*e.g.*, African clawed frog, yellowfin goby), and new nonnative species (*e.g.*, Chinese mitten crabs (*Eriocheir sinensis*)) may become a problem in the future. Some establishment and movement of nonnatives may be facilitated by water redistribution plans (D. Holland, *in litt.* 1999).

We received comments to the effect that there is cause for concern about the impacts of nonnative species on tidewater gobies (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999; K. Lafferty, *in litt.* 1999; C. Swift, *in litt.* 1999). The commenters surmise that if nonnative species are not responsible for tidewater goby declines by themselves, they may be important in concert with factors such as drought, habitat loss or alteration, and natural or anthropogenically induced fluctuations in population size (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999).

D. The inadequacy of existing regulatory mechanisms. A number of existing State, local, and Federal regulatory requirements provide some protection to the tidewater goby. Section 10 of the Rivers and Harbors Act, section 404 of the Clean Water Act, the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the California Coastal Act, the California Department of Fish and Game's streambed alteration permit program, and the State Water Resources Control Board's stormwater control program all provide some level of protection for the goby and its habitat. At the time of the original listing, however, we concluded that the existing regulatory mechanisms were inadequate to protect the tidewater goby.

In the proposed delisting rule, we changed our position, stating that there is little evidence to support the conclusion that existing regulatory mechanisms inadequately protect the tidewater goby or are contributing to substantial or widespread population decline and loss in the northern portion of the species' range. We stated that (1) review and permitting of projects under sections 10 and 404 was unlikely to allow the extent of destruction and modification of habitat that occurred prior to their implementation, (2) measures included in section 404 permits because of the presence of other listed and sensitive species (*e.g.*, California red-legged frog (*Rana aurora draytonii*), steelhead trout (*Oncorhynchus mykiss*), unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*)) provide protection of tidewater goby habitat, (3) a review of the Environmental Protection Agency's (EPA's) AQUIRE on-line database found no contaminant data directly relating to tidewater goby, and (4) in the current regulatory environment, little evidence exists to support the conclusion that water diversions, groundwater overdrafting, and modifications in salinity regimes, or the discharge of effluents are posing a

significant threat to the tidewater goby. In contrast, we felt that existing regulatory mechanisms failed to protect tidewater gobies in the southern portion of the range. We were concerned because the small number of extant tidewater goby populations in Orange and San Diego Counties would make the loss of any one population a greater cause for concern than in the northern portion of the range.

Several commenters expressed concern over our changed perspective about the northern range. They stated that we presented no evidence to support the contention that environmental regulations have substantially reduced the potential for the substantial habitat loss and modification that occurred historically, instead inferring the conclusion from the relatively small number of known population extirpations since the implementation of major environmental programs in the early 1970s (J. Buse, *in litt.* 1999). Commenters also claimed that our assertion that tidewater goby will be protected by measures for other listed and sensitive species assumes that the species have substantially the same requirements, have the same timing of life history stages, or share the same habitats (J. Buse, *in litt.* 1999; M. Capelli, *in litt.* 1999; T. Frink, *in litt.* 1999; D. Holland, *in litt.* 1999; S. Manion, Resource Conservation District of the Santa Monica Mountains, *in litt.* 1999; J. Smith, *in litt.* 1999; R. Swenson, *in litt.* 1999; A. Wetzlar and M. Gold, *in litt.* 1999). This may not be the case; in fact, there is not complete overlap in the distribution of these species and the tidewater goby (e.g., J. Buse, *in litt.* 1999; D. Holland, *in litt.* 1999; R. Swenson, *in litt.* 1999). For example, steelhead and unarmored threespine stickleback are not found in all locations where tidewater gobies occur (J. Buse, *in litt.* 1999; R. Swenson, *in litt.* 1999). Similarly, the range of the California red-legged frog only extends to the vicinity of Point Reyes National Seashore, leaving tidewater gobies north of that area no protection from those regulations protecting the frog (D. Holland, *in litt.* 1999).

Several comments also suggested that regulatory agencies (e.g., Corps, California Coastal Commission) and some local governments have only become aware of the tidewater goby since it was listed and that the Act has, in fact, protected populations of the tidewater goby (J. Buse, *in litt.* 1999; M. Capelli, *in litt.* 1999). We agree that listing the goby under the Endangered Species Act has provided focused protection to this species and that, if the tidewater goby remains listed, proposed

and future project proponents and agencies will be more likely to specifically consider the tidewater goby in their planning. That benefit notwithstanding, we have not changed our view that review and permitting of projects under sections 10 and 404 as well as other state and local programs is unlikely to allow the extent of destruction and modification of habitat that occurred prior to the listing.

Finally, several comments took issue with our interpretation of the results of our search of EPA's AQUIRE database. They indicated that a vast body of literature documents the effects of effluents, runoff and contaminants on aquatic organisms and habitats. Even if species-specific data about effects to the goby are lacking, this body of literature suggests effluents, runoff, and contaminants could be a threat to the tidewater goby (D. Holland, *in litt.* 1999), to the extent that they remain even after the prevention and remediation measures required by various local, State, and Federal regulations.

We continue to believe that existing State, local, and Federal regulatory mechanisms provide substantial protections to the tidewater goby. We recognize that these existing mechanisms may not address all the threats to the goby discussed in this notice, and are not in themselves sufficient basis to delist the species.

E. Other natural or manmade factors affecting their continued existence.

Drought. In the final listing rule, we stated that the most significant natural factor adversely affecting the tidewater goby was drought and the resultant deterioration of coastal and riparian habitats. At the time, California had recently experienced five consecutive years of lower than average rainfall. We felt that these drought conditions, when combined with human-induced water reductions, degraded coastal and riparian ecosystems and created extremely stressful conditions for aquatic species. Formerly large tidewater goby populations declined in numbers at this time because of the reduced availability of suitable lagoon habitats (e.g., San Simeon Creek, Pico Creek). Other tidewater goby populations disappeared when lagoons dried (e.g., Santa Rosa Creek).

The proposed delisting rule reported that, since the end of the drought, 14 sites believed to be extirpated had been recolonized. The survival and recovery of these populations following the drought alleviated the concern that drought exacerbated by human-induced water reductions would result in significant permanent population

decline and loss. In southern California, however, we stated that the loss of many of the larger tidewater goby populations had made recolonization of smaller intermittent lagoons much more unlikely. Therefore, we concluded that extended droughts, along with other physical alterations to the lagoons, threatened the southern California portion of the tidewater goby range.

Periodic droughts are a historical feature of California, which has been repeatedly subject to prolonged droughts (M. Capelli, *in litt.* 1999; T. Frink, *in litt.* 1999; D. Holland, *in litt.* 1999; R. Swenson, *in litt.* 1999). We have documentation in the final listing rule and the proposed delisting rule of the dramatic effects drought can have on the tidewater goby. It is not unexpected that species respond to climatic fluctuations, booming when conditions are favorable and declining sharply when conditions are adverse (T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999; W. Watson, fisheries biologist, *in litt.* 2000; M. Marchetti, *in litt.* 2001). Such natural population fluctuations assume a different character when considered in conjunction with other threats to the species, such as coastal development projects, freshwater diversions, pollution, siltation, urban development, and introduced species. A large body of scientific research has demonstrated that when a cyclic species encounters drastic anthropogenic disturbance, there is pronounced threat of extirpation (M. Marchetti, *in litt.* 2001). When coupled with the other human-related modifications to the habitat of the tidewater goby, these droughts increase in significance, and will undoubtedly be repeated in the future (M. Capelli, *in litt.* 1999; D. Holland, *in litt.* 1999). In addition, because the tidewater goby has life history characteristics that make it vulnerable to extirpation (e.g., short lifespan, preference for still water and low-salinity habitats that have a limited distribution, and lack of marine dispersal in all but wet years), there may be little buffer for the species when drought returns (Swenson, *in litt.* 1999). Finally, widely dispersed populations of tidewater gobies occur in the northern portion of the range as well as in the southern portion (M. Capelli, *in litt.* 1999). We argued in the proposed delisting rule that tidewater gobies in the southern portion of the range were threatened by extended droughts because many of the larger tidewater goby populations had been lost, making recolonization of smaller intermittent lagoons much more unlikely. Because it appears that recolonization may not occur over anything but short distances

(i.e., 10 km (6 mi)) (see comments 17 to 22 and Factor A above) and because populations in the northern portion of the range appear to be widely separated, we believe we need to reevaluate our assertion that only southern tidewater goby populations are threatened by drought.

We have reconsidered our analysis of the tidewater goby's status with respect to drought. When evaluating the status of a species which fluctuates widely in response to climatic conditions, we should consider a time period which includes the full range of climatic variation. In proposing to delist the tidewater goby, we considered only one drought cycle. Drought can have dramatic negative effects on tidewater goby, at least decreasing goby populations to very low levels (perhaps to the point where they are undetectable) and at most extirpating populations (see final listing rule and delisting proposal). Because future droughts in California are a certainty, we know that tidewater gobies will be subject to the negative effects of drought again. We need to consider the potential magnitude and importance of these drought events on long-term persistence of the tidewater goby prior to delisting any portion of the range of the species.

Flooding. In the final listing rule we indicated that events such as river flooding and heavy rainfall have reportedly destroyed tidewater goby burrows and washed tidewater gobies out to sea. While the tidewater goby was undoubtedly subjected to natural flood events before major human alteration of drainage basins, urbanization and channelization increased the frequency, and perhaps the intensity, of the events. Increased isolation of tidewater goby populations through extirpation of intervening populations reduces the likelihood of successful recolonization after a population is lost in a flood event.

In the proposed delisting rule, we changed our position, stating that flood events have been shown to have no significant adverse effect on tidewater goby populations. Instead, we felt the flushing action of floods was probably the primary mechanism for colonization of other habitats along the coast (Lafferty *et al.* 1996, Swift *et al.* 1997). In southern California, however, we observed that the historic extirpation of many tidewater goby populations has left the remaining populations more isolated. Thus, tidewater gobies must travel greater distances and from smaller source populations, making natural recolonization much more uncertain and difficult. We implied that, on balance, this isolation made flooding

more detrimental in southern California than it was in northern California.

As has been mentioned above, we may have overestimated the tidewater goby's potential for recolonization. If the tidewater goby's ability to recolonize sites is actually highly restricted (i.e., no more than 10 km (6 mi) (T. Frink, *in litt.* 1999; R. Swenson, *in litt.* 1999; Swift *et al.* 1997 as cited in D. Holland, *in litt.* 1999), the degree of isolation of tidewater goby populations in northern California is greater than we estimated at the time of the delisting proposal.

Competition with nonnative species. In the final listing rule we stated that competition with introduced species is a potential threat to the tidewater goby. At the time, no problems had been reported, but we were concerned that the spread of the introduced yellowfin goby and chameleon goby might have a detrimental effect of the tidewater goby. In the proposed delisting rule, we stated that no documented extirpation or population decline can be directly attributed to these or other introduced competing species. However, as noted by Holland (*in litt.* 1999), direct evidence of extirpation or population decline through competition is rarely forthcoming, especially without focused surveys. Further research may clarify the impact of competition on tidewater goby.

Population size. Tidewater goby populations are known to fluctuate in size within and between years (Swift *et al.* 1989, Holland 1992, Swift and Holland 1998 as cited in D. Holland, *in litt.* 1999). Populations that are continuously small, or that fluctuate to small size (as tidewater goby populations tend to do), are more susceptible to extirpation from random demographic, environmental, and genetic events than larger populations are. Demographic events that may put small populations at risk involve chance variation in age, sex ratios, and other population characteristics, which can change birth and death rates (Shaffer 1981, 1987; Lande 1988; Meffe and Carroll 1997; Primack 1998). Small, isolated populations are also vulnerable to genetic drift (random changes in gene frequencies) and inbreeding (mating between close relatives). Genetic drift and inbreeding may lead to reductions in the ability of individuals to survive and reproduce (i.e., reductions in fitness) in small populations. In addition, reduced genetic variation in small populations may decrease the potential for persistence in the face of long-term environmental change (Shaffer 1981, 1987; Primack 1998).

Finding and Withdrawal

We proposed to delist the northern portion of the tidewater goby range because we felt the original listing was in error. Specifically, we believed that new evidence showed that (1) there were more populations in the northern portion of the range at the time of the delisting proposal than at the time of the listing, (2) the threats to those populations were less severe than previously believed, and (3) the tidewater goby has a greater ability to recolonize than was known at the time of the listing. We received 45 responses from individuals, agencies or other parties. Thirty-eight of the responses opposed our proposal to remove the northern populations of the tidewater goby from the list of endangered and threatened wildlife. Most commenters did not agree that the original listing was in error. Further, our specific conclusions in the proposal were not corroborated by the comments we received during the three comment periods. In particular, the commenters, including many tidewater goby scientific researchers, suggested that we overemphasized the importance of the discovery of new tidewater goby populations, that we minimized the severity of the threats in the northern portion of the range, and that we overstated the recolonization ability of the tidewater goby. After review of the information presented, we find the commenters' arguments with respect to the goby's ability to recolonize compelling and believe that it is prudent to withdraw the proposed delisting. Withdrawing the delisting proposal for the northern populations of the tidewater goby makes the establishment of an endangered southern California DPS unnecessary. We will focus instead on proceeding with the recovery planning process that will both guide conservation activities for the species and make explicit under what criteria the tidewater goby should be considered for delisting.

We conclude, therefore, based on our review of the best information currently available, including these comments and the recommendations of two scientific peer reviewers, and for the reasons discussed throughout this withdrawal notice, that the tidewater goby should remain listed as an endangered species throughout its range. We withdraw our June 24, 1999, proposal to remove the northern populations of tidewater goby from the list of endangered and threatened wildlife and the concurrent proposal to establish an endangered distinct population segment of tidewater goby in Orange and San Diego

Counties, CA (64 FR 33816).

References Cited

A complete list of all references we cited, as well as others, is available on

request from our Ventura Fish and Wildlife Office (see **ADDRESSES** section).

Dated: November 1, 2002.

Steve Williams,

Director, Fish and Wildlife Service.

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