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**Status Review Update for the Steelhead Northern California
Evolutionarily Significant Unit**

WEST COAST STEELHEAD
ADMIN RECORD
VI.A.

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TABLE OF CONTENTS

SUMMARY	1	
INTRODUCTION	2	
RISK ASSESSMENT	3	
Population Abundance	3	
Population Trends and Production		4
Historical Data	4	
Current Data	4	
SUMMARY AND CONCLUSIONS OF RISK ASSESSMENTS		4
HATCHERY STOCKS	5	
REFERENCES	7	
FIGURES	8	

SUMMARY

The National Marine Fisheries Service (NMFS) has decided to reconsider the decision to leave the Steelhead (anadromous *Oncorhynchus mykiss*) Northern California Evolutionarily Significant Unit (ESU) as a candidate listing species. The previous status review update found that steelhead in this ESU "are likely to become endangered in the foreseeable future". This document provides and reviews updated biological data for consideration in this listing decision.

Updated abundance trend data were received for winter steelhead on the Lower Eel River, summer steelhead on the Middle Fork of the Eel River, and on summer steelhead for Redwood Creek, Humboldt County. Three other data series that were considered in the previous update; winter steelhead on Prairie Creek, summer steelhead on the Van Duzen and the Mad rivers; were found to have consistency problems precluding their use in trend analysis. Updated hatchery release data were received for two of the three hatcheries in the ESU; the Van Arsdale Station, and Mad River Hatchery (winter-run) stocks. Data from Yager Creek Hatchery were not available. Three previously considered hatchery stocks; Mad River Hatchery (summer-run), Ten Mile River, and North Fork of the Gualala River were not considered due to termination of hatchery production.

Steelhead population status has shown slight improvement since the last status review update. Current steelhead population abundances are well below 1980's levels and far below pre-1960s populations. While there is no overall abundance estimate for this ESU, the two Eel River sites abundance estimates have doubled to 884 from around 400 fish. This is lower than the 1,000 to 2,000 numbers seen in the 1980s and the around 4,000 fish average seen before 1960. Hatchery returns on the Eel River have increased dramatically in recent years. This is attributed to the practice of raising the steelhead to a large size to escape predation by introduced pike minnow. Redwood Creek summer steelhead surveys remain low, fewer than 10 adult fish. This is down from 1980s values in the mid-teens.

Hatchery influence is relatively small in this ESU. The Mad River Hatchery winter stock was founded with Eel River fish and averaged 2,232,230 releases for 1996 and 1997 and 273,521 for 1998 and 1999. The Van Arsdale Station and the Yager Creek Hatchery stocks are both taken locally and are released to the same watershed. Van Arsdale Station averaged 58,760 releases between 1995 and 1998 and is now inactive, having met its steelhead emergency recovery goal.

INTRODUCTION

In December 1997, the National Marine Fisheries Service's (NMFS) Steelhead Biological Review Team (BRT) concluded that steelhead (anadromous *Oncorhynchus mykiss*) in the North California Evolutionarily Significant Unit (ESU) were "likely to become endangered in the foreseeable future" (Schiewe 1997). This listing action was a response to petitions seeking protection for steelhead under the Endangered Species Act (ESA). The listing action initiated status reviews of multiple steelhead ESUs including Northern California (Busby et al. 1994, 1996, Schiewe 1997). NMFS subsequently made a decision to allow steelhead in the Northern California ESU to remain as a candidate species due to an evaluation of State and Federal conservation measures. Conservation measures which reduced threats to steelhead in the Northern California ESU were primarily the implementation of a North Coast Steelhead Memorandum of Agreement (MOA) with the State of California. This MOA provided a number of protections, including a package of proposed forest practice rule revisions to strengthen non-Federal forest protections, a change in harvest regulations, a review of California hatchery practices, implementation of habitat restoration activities, and implementation of a monitoring program. On October 6, 1999, the California Board of Forestry failed to take action on the package of forest practice rules. The NMFS Southwest Region (SWR) regarded this failure as a breach of the MOA. Subsequent to the breach of the MOA, NMFS announced its intention to reconsider the March 19, 1998 decision not to list steelhead in the Northern California ESU. This Status Review update examines new or updated information on Northern California Steelhead ESU available since the previous Status Review.

The Northern California Steelhead ESU extends from Redwood Creek just south of the Klamath River in Humboldt County, California to just north of the Russian River, Sonoma County, California. This ESU includes both winter and summer steelhead populations. Allozyme and mitochondrial DNA data indicate genetic discontinuities between steelhead of this region and those to north and to the south. Freshwater fish species assemblages in this region are derived from the Sacramento River Basin, whereas streams to north include representative of the Klamath-Rogue ichthyofaunal province. Risk factors identified for this ESU include freshwater habitat deterioration due to sedimentation, severe flood events related to land management practices, and the introduced pike minnow (*Ptychocheilus grandis*), a predator on juvenile salmon in the Eel River.

The BRT also considered the issue of including winter and summer steelhead in the same ESU and concluded that within a geographic area, winter and summer steelhead typically are more genetically similar to one another than either is to populations with similar run timing in different geographic areas. However, the BRT did recognize that some degree of reproductive isolation can and probably does occur between winter and summer steelhead and therefore the two groups represent significant portions of the population within the ESU. These data are presented within the risk assessment groups by winter and summer runs.

RISK ASSESSMENT

Population Abundance

Limited updated steelhead abundance data for this ESU were available and show only modest increases since the last BRT update (Schiewe 1997). The combined totals of two Eel River sites have increased in numbers to 342 winter steelhead (Fig. 1) and 542 summer steelhead (Fig. 3) or a total of 884 fish (Steiner Environmental Consulting 1998; Grass, A.¹; Jones, W. and S. Harris²) from around 400 total fish in the last update (Schiewe 1997). This remains well below 1980s estimates of 1,000 to 2,000 fish and even further below pre-1960 populations levels (Fig. 2, hatchery supplementation starts in 1970). Redwood Creek summer steelhead abundance remained low (Fig. 4), less than 10 adult fish (Anderson, D.³). The number of winter hatchery steelhead increased dramatically to near-record high levels at the Van Arsdale Station (Fig. 2); however a comparable increase in natural winter steelhead at Van Arsdale was not observed. To further examine whether the increase in Van Arsdale hatchery steelhead has any counterpart in naturally spawned steelhead, two nearby juvenile steelhead time-series were examined; 1) six sites on the Eel River (Fig. 5, Harris, S., and W. Jones⁴) and 2) twenty-two sites on the Ten-Mile River on the Mendocino Coast (Fig. 6, Hines, D.⁵). Neither data set showed any indication of strong years in 1998 or 1999.

Steelhead are widespread throughout the Northern California ESU. Compilation of presence-absence data from 345 streams that open to the ocean found *O. mykiss* in 341 streams (Adams 1998). The 98% presence found for Northern California steelhead ESU is much higher than two previously threatened listings: coho in the same area which are present in approximately 50% of the streams with historical records and steelhead in the South-Central California ESU which are present in 69% of the streams in that ESU.

¹ Grass, A. 1999. Van Arsdale steelhead trapping data, 1996-99. Pers. Comm.

² Jones, W. and S. Harris. 1999. Eel River summer steelhead survey data, 1966-99. Pers. Comm.

³ Anderson, D. 1999. Redwood Creek summer steelhead survey data, 1980-99. Pers. Comm.

⁴ Harris, S. and W. Jones. 1999. Eel River steelhead electrofishing survey data, 1983-99. Pers. Comm.

⁵ Hines, D. 1999. Ten Mile River steelhead electrofishing survey data, 1993-99. Georgia Pacific Co. Pers. Comm.

Population Trends and Production

Historical Data

Three sources of historical data (Streamnet⁶ for winter steelhead in the Northern California ESU (Sweasy Dam on the Mad River [Fig. 7], Benbow Dam on the South Fork of the Eel River [Fig. 8], and Cape Van Horn Station on the Middle Fork of the Eel River [Fig. 2]) all show substantial declines prior to 1960 (Schiewe 1997). There are no data for summer steelhead prior to 1960, but anecdotal evidence indicate similar levels of declines.

Current Data

Updated time series data indicate little change since the previous review (Eel River winter, Fig. 1, Eel River summer (Fig. 3), and for Redwood Creek summer, Fig. 4). Naturally spawned Eel River winter steelhead counts at Van Arsdale Station have had modest increases in 1997-98 and 1998-99 years, but abundances are much lower than the 1980s abundances (Fig. 1). Total Eel River winter steelhead have shown dramatic increases in the last several years, but these increases consist predominantly of hatchery fish from CDF&G's Upper Eel River Emergency Hatchery Program. Hatchery steelhead are identified by eroded fins until 1996, after which there were 100% marking. Abundance of Eel River summer steelhead snorkel survey have decreased from levels observed in the 1970s and 1980s and now are at some of the lowest levels ever observed (Fig. 3). A similar though less dramatic pattern is apparent for Redwood Creek summer steelhead snorkel surveys, and again current abundances are among the lowest (Fig. 4). Although, the previous update (Schiewe 1997) considered winter steelhead data from Prairie Creek weir counts and summer steelhead snorkel survey data from the Van Duzen and Mad Rivers, further investigation of these data series found inconsistencies in survey areas or protocols that make them unsuitable for use as population trend indicators. Prairie Creek weir counts did not cover the entire season early in the time series. Van Duzen snorkel surveys use landowner estimates in several years and covers different survey areas in different years. Mad River snorkel surveys included a significant addition of good habitat in the early 1990s to survey area.

SUMMARY AND CONCLUSIONS OF RISK ASSESSMENTS

There was little change in Northern California steelhead ESU status since the last update. Trend numbers have shown small increases, but there are no substantial changes in abundance. There is no estimate of total abundance for this ESU, although steelhead are widely distributed throughout the region. For the best data set, the Eel River winter and summer steelhead abundances, populations are still severely reduced from pre-1960 levels. Some uncertainty

⁶ Streamnet. 1999. On-line database. Pacific States Marine Fisheries Commission.

remains about the underlying causes of decline of steelhead in this ESU. Although fish in some streams do not have access to historic spawning habitat due to blockages, there are numerous tributaries with apparently accessible habitat. There is concern about the reduction in riparian and instream habitat quality and increased sedimentation. Predation by the introduced pike minnow is considered to be a major threat to juvenile steelhead in the Eel River.

Finally, the lack of reliable and widespread steelhead abundance and trend data is in itself a risk factor for this ESU.

HATCHERY STOCKS

The BRT also considered the status of hatchery stocks of steelhead in the Northern California ESU (Schiewe 1998) and that information is updated and summarized here. The BRT considered six hatchery stocks: Van Arsdale Station (Upper Eel River), Yeager Creek (Lower Eel River tributary), River (summer run), River (Winter Run), Ten Mile River, North Fork Gualala River. Three of these six hatchery stocks; Ten Mile River, North Fork Gualala River, River (summer run); have been inactive three years or longer. These hatchery stocks could not be reactivated without significant environmental and ESA review and therefore are not considered here.

The Van Arsdale Station (formerly known as Cape Horn Dam or Snow Mountain) is located on the Upper Eel River at the base of Cape Horn Dam, seven miles downstream from Lake Pillsbury. This facility is currently being run by CDF&G as an emergency restoration program for winter steelhead and chinook salmon. It has been operated as an egg-taking station intermittently since the 1969. Eggs are collected from adult steelhead migrating into the Station and are reared at River Hatchery. All fish are released into the Eel River at the Station. The only out-of-ESU supplementation were 76,000 Russian River steelhead (Central California Coast Steelhead ESU) released into the Eel River in 1985 (NRC 1995). Steelhead juvenile releases have been 40,525 (1995), 76,680 (1997), 59,075 (1998), and 0 (1999) (Grass, A.¹). Currently, the Station has met its emergency recovery goals of trapping a thousand steelhead for three consecutive years and for steelhead, hatchery production has ceased. This stock was considered by the BRT to be part of the ESU and essential for recovery.

The Yeager Creek winter steelhead stock is trapped and reared at a facility operated by Pacific Lumber Company on a tributary of the Van Duzen River (a tributary of the Lower Eel River). Steelhead smolts from this program are released into Yeager Creek and its tributaries. Steelhead juvenile releases numbers were not available. The BRT considered this stock to be part of the ESU, but not essential for recovery.

River Hatchery, located on the River near the town of Blue Lake, California, has been operated by CDF&G since 1971. Between 1972 and 1974, winter steelhead broodstock at River Hatchery were imported almost exclusively from the South Fork Eel River fish (taken at Benbow

Dam). By 1974, returns to the hatchery supplied about 90% of the egg take with other eggs coming from the Eel River. River Hatchery steelhead most closely group with Eel River steelhead in allozyme analyses (Busby et al. 1996). Steelhead smolts from this program are released into the Mad River and its tributaries and have been 4,000,010 (1996), 4,446,451 (1997), 283,547 (1998), and 263,495 (1999) (Mad River Hatchery⁷). The BRT considered this stock not to be part of the ESU and not to be essential to recovery.

⁷ Mad River Hatchery. 1999. Steelhead smolt releases, 1996-99. Pers. Comm.

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- Steiner Environmental Consulting. 1998. Potter Valley Project Monitoring Program: Effects of operations on Upper Eel River anadromous salmonids. Prepared for Pacific Gas and Electric. 650 pp.

FIGURES

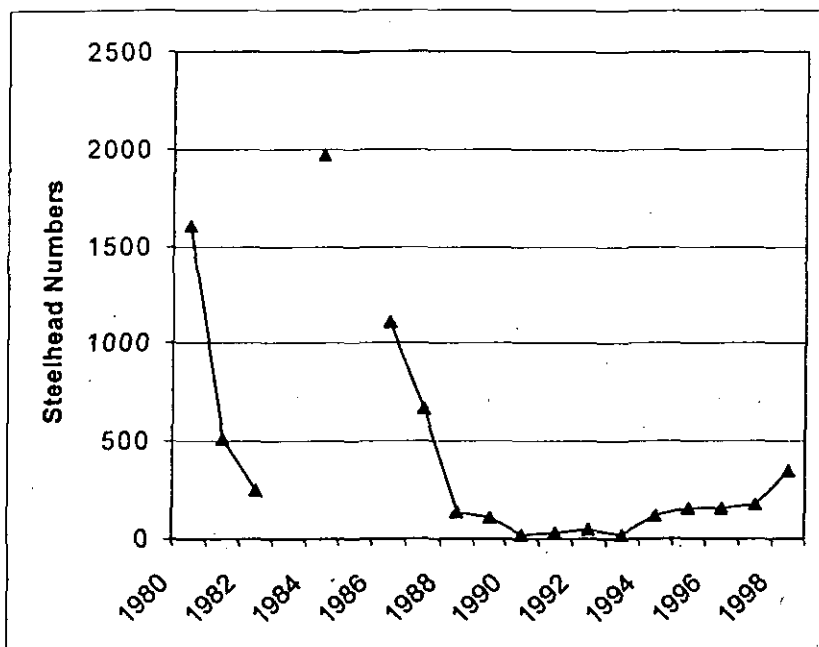


Figure 1 Numbers of naturally spawned winter steelhead (dam counts) at Van Arsdale Station, Eel River from 1981-99 (Steiner Environmental Consulting 1998 and A. Grass¹).

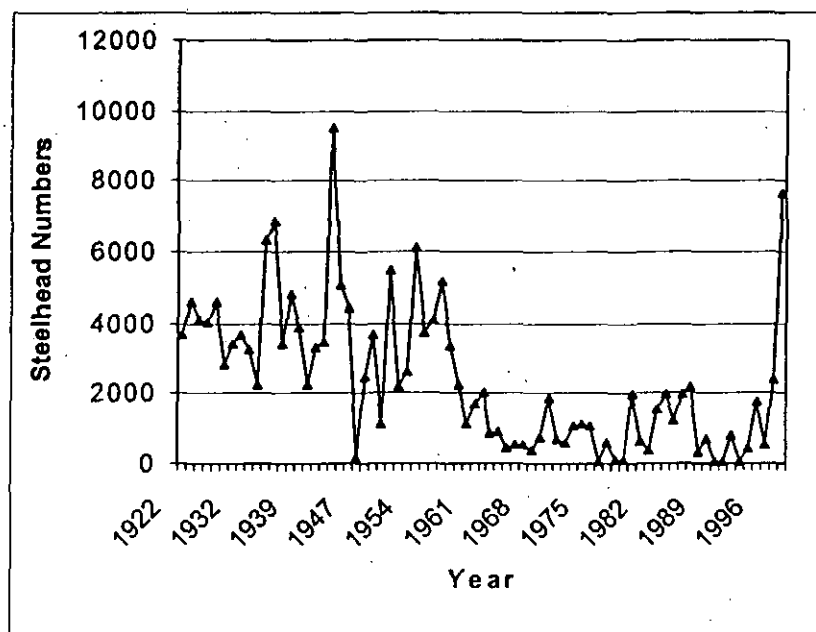


Figure 2 Number of total winter steelhead numbers at Van Arsdale Station (dam counts), Eel River from 1922-99 (Steiner Environmental Consulting 1998 and A. Grass¹).

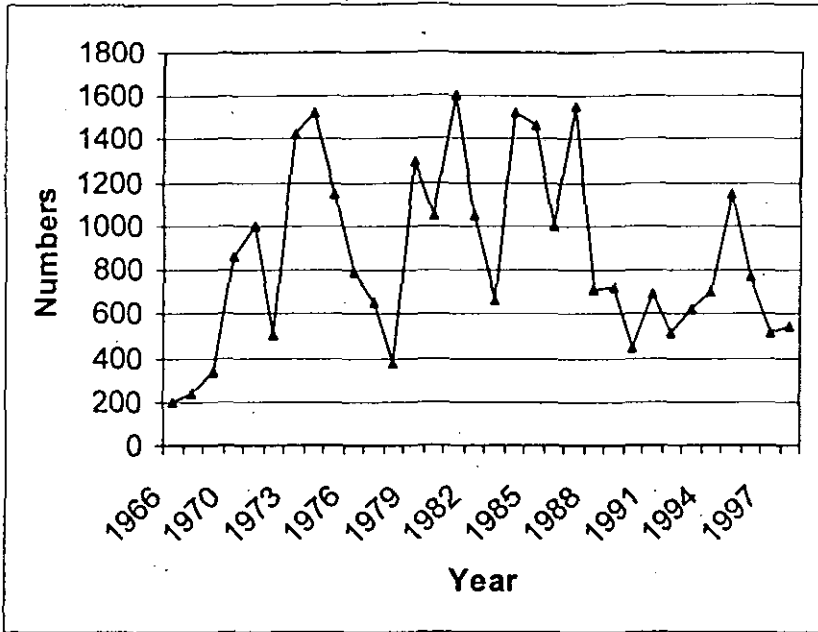


Figure 3 Numbers of summer steelhead (snorkel surveys) from the Middle Fork of the Eel River from 1966-99 (Jones, W. and S. Harris²).

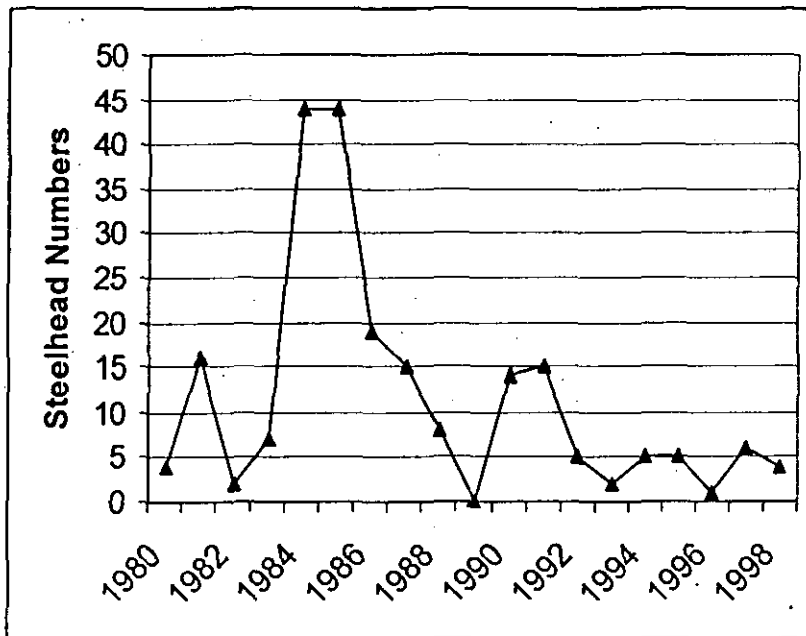


Figure 4 Numbers of summer steelhead (snorkel surveys) from Redwood Creek from 1980-99 (Anderson, D.³).

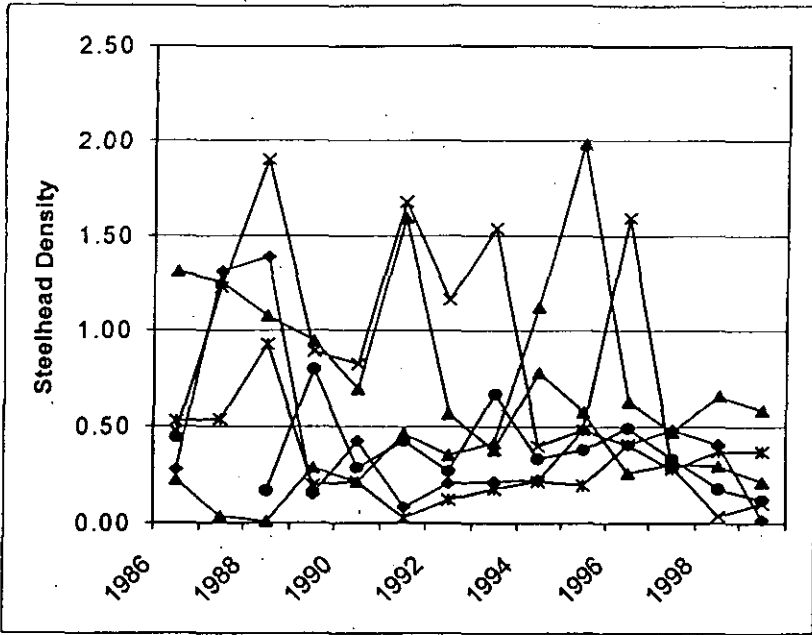


Figure 5 Juvenile steelhead density at six sites on the Eel River, Mendocino County: Hollowtree Creek, Lower, Middle, and Lower, Middle Fork at Fern Point and Osborne, and Ryan Creek from 1987-99 (Harris, S., and W. Jones⁴).

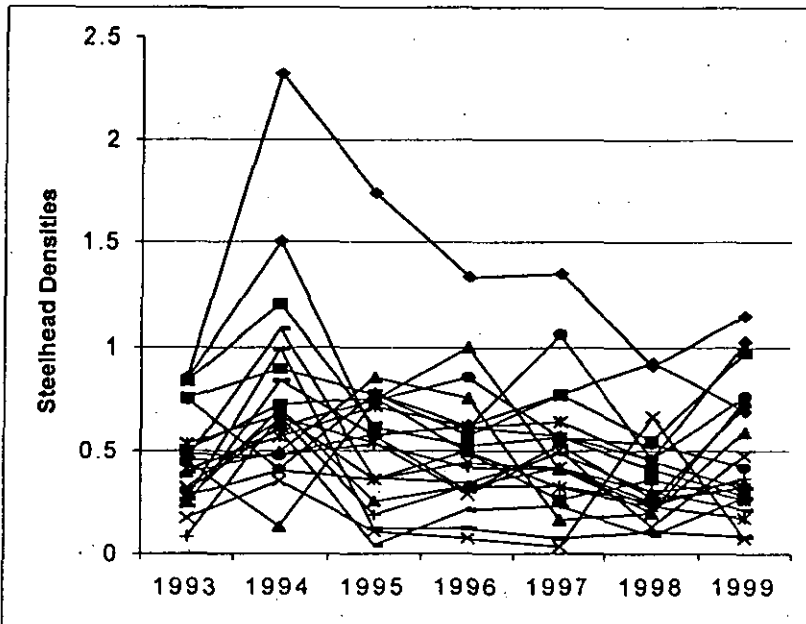


Figure 6 Juvenile steelhead densities at 22 sites on the Ten Mile River, Mendocino County Coast from 1983-99 (Hines, D.⁵).

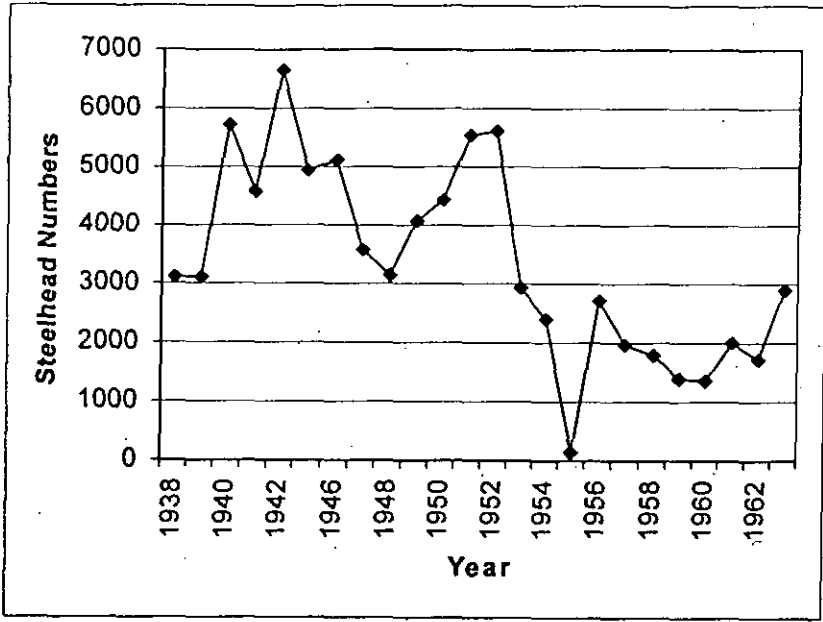


Figure 7 Number of steelhead adults counted at Sweasy Dam, Humboldt County from 1938 to 1963 (Streamnet⁶).

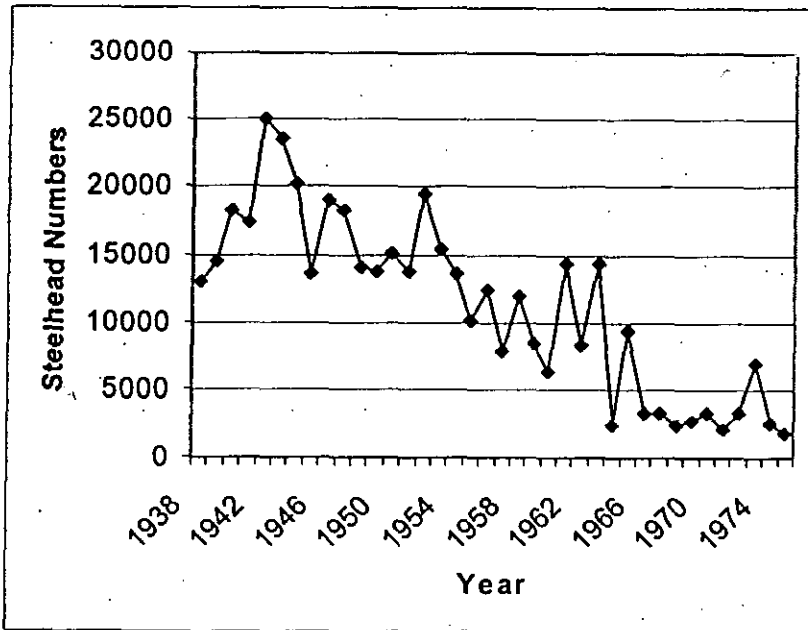


Figure 8 Numbers of steelhead adults counted at Benbow Dam, Humboldt County from 1938 to 1975 (Streamnet⁶).