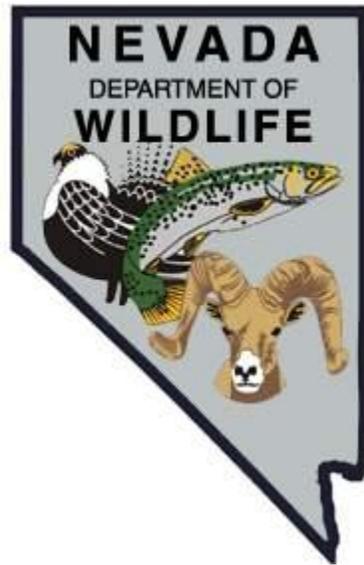


NEVADA DEPARTMENT OF WILDLIFE  
STATEWIDE SPORT FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS  
F-20-48  
2012

STREAMS AND RIVERS MANAGEMENT  
EASTERN REGION



**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
ANNUAL JOB PROGRESS REPORT**

Table of Contents

<u>Contents</u>	<u>Page</u>
SUMMARY .....	1
BACKGROUND .....	1
OBJECTIVES and APPROACHES .....	4
PROCEDURES .....	5
FINDINGS .....	6
MANAGEMENT REVIEW .....	10
RECOMMENDATIONS .....	10

List of Figures

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Humboldt River Thermal Monitoring .....	7
2	Maggie Creek Discharge .....	10
3	Desiccated and frozen NZMS .....	10

List of Tables

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Maggie Creek NZMS Transect .....	8
2	Upper Humboldt NZMS Transect.....	8
3	Lower Humboldt NZMS Transect.....	9

**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
ANNUAL JOB PROGRESS REPORT**

**State:** *Nevada*  
**Project Title:** *Statewide Fisheries Program*  
**Job Title:** *Eastern Region Streams and Rivers Management*  
**Period Covered:** *January 1, 2012 through December 31, 2012*

**SUMMARY**

Nine sites on the Humboldt River were spot-shocked between the South Fork Humboldt River confluence and Dunphy. During the survey, smallmouth bass, green sunfish, Tahoe suckers, and carp were found. Temperature fluctuations from May to September were recorded via a thermograph that was launched near Barth Pit. Angler contacts were conducted on three separate occasions with no anglers being surveyed.

The upper South Fork Humboldt River from Lucky Nugget causeway to the gauge station was surveyed to monitor spring spawning trout sites (redds). The survey produced 56 redds, with 9 being active. A total of 21 fish were documented. The South Fork Humboldt River was also checked for anglers four times during 2012. During these random angler contacts, 13 fishermen were contacted. These anglers spent 26 hrs to catch 36 fish, averaging 22 in long. There was an average of 2.8 fish caught per angler, 2.0 hrs fished per angler, and a catch rate of 1.4 fish per hour.

The quality of data collected during the June 2012 population survey in McCoy Creek was hindered due to increased runoff from winter snowpack and the steep gradient. A previous survey also noted high flows and steep gradients; however, they were able to effectively shock the stream. Timing of the survey in relation to winter runoff is vital to conducting a quality survey. It is recommended the McCoy Creek survey be completed in late summer of 2013 when flow is at baseline.

In 2012, New Zealand mud snails (NZMS) were detected in Lower Maggie Creek. Surveys were conducted to assess the distribution of snails in Maggie Creek and the Humboldt River. Three transects were established to assess any change in density and distribution within the Humboldt drainage. Lower Maggie Creek had the highest densities at 61,266 snails per square meter. Dewatering of Maggie Creek was attempted in January and the impacts will be assessed with a second survey in 2013.

**BACKGROUND**

Humboldt River, Mainstem

Historically, the upper Humboldt River supported a thriving Lahontan Cutthroat trout fishery. An article from the Elko Independent in 1869 read "At Carlin, boys fish in Maggie, Susie and Mary's River (historic name of Humboldt River) and come in with long strings of fine, delicious trout which are sold so cheaply in the streets that hotel

keepers can't compete. Trout fresh from the limpid water of the Humboldt weigh 1-3 pounds and are plentiful in the market at cents each". Unfortunately, since that time the river has been so degraded that it can no longer provide year-round habitat for trout. However, the perennial flows and its proximity to a population base led to stocking many different fish species in an attempt to establish a sport fishery. The earliest record of stocking the Humboldt River was in 1895 when 10,000 brook trout were introduced. Since that time, rainbow, blackspotted (LCT), hybrid, and brown trout have all been tried as well as a multitude of warm water species, including largemouth bass, smallmouth bass, white bass, bluegill, white crappie, and channel and bullhead catfish.

Until the recent recognition of a smallmouth bass population, the river was considered a marginal and sporadic sport fishery with the majority of catch coming from Barth Pit, a mining crater that was claimed by river floodwaters. The construction of South Fork Reservoir in 1988 and subsequent establishment of a smallmouth bass fishery has since provided a donor population, which augments the river every spring during high water releases. Survey and assessment of this fishery and its dynamics should be a priority so that an effective management strategy can be implemented to sustain this resource.

#### Humboldt River, South Fork

Completion of the South Fork Reservoir Dam in 1988 essentially split the South Fork Humboldt River (SFHR) into two sections. The upper river, from South Fork Reservoir to the highway bridge in Lee, has provided a fair sport fishery in the past. The primary limiting factors for trout in this stretch include a lack of suitable pools and cover (from stream channelization and willow eradication) and increased water temperatures during critical summer months (reduction of flows due to irrigation diversions). This section of river is now managed as a trophy trout fishery to provide some protection for the spring and fall spawning runs that emanate from the reservoir.

The lower river, from South Fork Reservoir to the confluence with the Humboldt River, never maintained much of a fishery due to poor habitat and water quality conditions. Past excessive livestock use has led to poor bank stability and stream cover, poor pool development, and very high summer water temperatures. However, subsequent water releases from the reservoir have created an improved sport fishery in the lower river. These releases have not only improved water quality, but have essentially stocked the lower river with fish from the reservoir. Evidence of natural reproduction and recruitment in brown and rainbow trout have increased in the lower river since mid-1990 to 2000.

#### McCoy Creek

McCoy Creek is located in the Schell Creek Mountains of White Pine County. The stream originates at an elevation of approximately 10,330 ft and terminates at approximately 5,600 ft. McCoy Creek drains a small portion of the east side of the Schell Mountains and into the Spring Valley drainage. The stream is approximately 4.8

mi in length, of which 3.5 mi flow through land administered by the U.S. Forest Service, and the remaining 1.3 mi flowing through land administered by the BLM.

Fish populations were surveyed in 1995, 1984, and 1953. In 1995, there was a population estimate of 832 fish per mile and in 1984, densities were lower at 528 per mile. In 1977, there was in excess of 3,200 fish per mile between brown and rainbow trout and in 1953, there was a density of 245.5 fish per mile. There have been changes in equipment, techniques, and station locations throughout the years that make it difficult to compare results from surveys that span 52 years.

NDOW records indicate that stocking was conducted annually from 1950 to 1973 using three species of trout, Yellowstone cutthroat trout, rainbow trout, and brook trout. Currently, there have been reports of brown trout inhabiting McCoy Creek, along with rainbow trout and possible cutthroat rainbow hybrids.

### New Zealand Mudsnaill

Prior to August 2012, Nevada was thought to have only two populations of New Zealand mudsnails (*Potamopyrgus antipodarum*) (NZMS), one in the Salmon Falls River in northeast Nevada and the other in Lake Mead in southern Nevada. In August 2012, Nevada Department of Environmental Protection identified what was thought to be NZMS in Maggie Creek (Humboldt River drainage) near Carlin, Nevada. Samples collected by NDOW were analyzed by EcoAnalysis in September and positively identified as NZMS.

Further investigation revealed the infestation to be in lower Maggie Creek, with its uppermost distribution approximately 3 mi below the Newmont Mining Company cooling towers. All flow in lower Maggie Creek was created by a Newmont Mining Company dewatering project as Maggie Creek is intermittent upstream of the dewatering flow. NZMS were also detected in the Humboldt River downstream of the Maggie Creek confluence to the Highway 278 crossing. No mudsnails were detected at another survey site 5 mi downstream of the highway bridge, as well as a site near Dunphy on Interstate I-80.

While NZMS have great potential for wide-spread colonization due to their broad environmental tolerance, it is not known how quickly or to what extent they will colonize the Humboldt River. Control of NZMS in the Humboldt River is most likely not feasible, but there may be the potential eliminate the mudsnail population in lower Maggie Creek. Newmont Mining Company controls the flow and was willing to store water in their holding reservoir for a limited time in order to dry/freeze the creek. Surveys were also needed to gather baseline data on downstream distribution and relative abundance of NZMS in both the Humboldt River and Maggie Creek.

## OBJECTIVES and APPROACHES

Objective: General Native Sport Fisheries Management

Approaches:

### Humboldt River

- Establish and electroshock 5 transects from the North Fork Humboldt River confluence downstream to Battle Mountain.
- Use a recording thermograph from June to October to monitor seasonal water temperature fluctuations near Barth Pit.
- Conduct a general fisheries assessment through opportunistic angler contacts.

### South Fork Humboldt River

- Visually monitor the spawning migrations of rainbow trout for 3 days during spring and brown trout for 3 days during fall at established transects above and below the reservoir.
- Conduct a general fisheries assessment through opportunistic angler contacts.
- Revise the South Fork Humboldt River Fisheries Management Plan.

### Other Eastern Region Streams

- Conduct a general fisheries assessment through opportunistic angler contacts.
- Collect 5 sport fish from Kingston Creek and the Bruneau River for mercury analysis in cooperation with NDEP.
- Utilize Electrofishing to assess the status of non-native trout populations in McCoy Creek.
- Visually inspect substrate and/or emergent/submergent vegetation for New Zealand mudsnails (NZMS) in the Humboldt River below the Highway 278 bridge to assess downstream distribution, and in other locations of the Humboldt River drainage to be determined to assess possible mud snail presence.
- Sample three permanent transects (lower Maggie Creek, Humboldt River near the Highway 278 bridge, and one downstream on the Humboldt outside of the known distribution) in the fall and after spring runoff to assess relative abundance of NZMS utilizing grid or plot frames.
- Assist cooperators in implementation of NZMS control treatments in lower Maggie Creek by de-watering and associated monitoring activities.
- Implement outreach efforts including installation of warning signage to inform anglers and others of NZMS mudsnail presence and decontamination needs.

## PROCEDURES

### Humboldt River

Humboldt River Survey - Nine sites on the Humboldt River were spot-shocked between the South Fork Humboldt River confluence and Dunphy. All fish caught were measured, checked for body condition, and released.

Humboldt River Thermal Monitoring - A thermograph was launched on May 2, 2012 and retrieved September 11, 2012 in the mainstem Humboldt River near Barth Pit. The thermograph was set to record the temperature every 30 min.

Opportunistic Angler Contacts – In 2012, three different attempts to contact anglers fishing the Humboldt River near Palisades were completed.

### South Fork Humboldt River

Spawning Monitoring – During the spring of 2012, trout redd transects were surveyed on the South Fork Humboldt River to monitor spawning activity. Transects were located on the river above the reservoir, from the causeway to the gauging station, and to 0.55 mi below the dam. All transects were walked and visually surveyed with all redds being noted as to whether they were active, occupied, and/or abandoned.

Opportunistic Angler Contacts – Angler surveys were conducted in the summer by use of the creel clerk, as well the biologist. Fish length, fish species, and total hours fished were recorded during the angler contacts.

### Other Eastern Region Streams

Opportunistic Angler Contacts – If anglers were contacted, fish length, fish species and total hours fished were recorded.

Mercury Collections – Angling was used to capture fish for mercury analysis.

McCoy Creek Electrofishing - Electroshocking activities on McCoy Creek were conducted at stations pre-plotted on a USGS 7.5 minute topographical map at intervals of approximately 1 mi. Stations were given named waypoints using a hand-held Garmin eTrex GPS. When not prevented by dense riparian vegetation, a 100 ft, single pass electroshocking survey was completed using a Dirigo Model 850 backpack electroshocker. A dip net was used to capture stunned fish, which were temporarily held in a 5 gal bucket until shocking activities were completed. Captured fish were identified, measured (fork length in millimeters), and returned to the stream. Known misses with dip nets were noted.

A suite of habitat parameters was observed and recorded at each station and temperatures (water and ambient) taken with standard bulb thermometers. Flow was

measured at each station using the floating chip method. Digital photographs were taken of presumed rainbow-cutthroat hybrid trout. Survey data and photos are on file and available at the Ely Field Office of the Nevada Department of Wildlife.

New Zealand Mudsnaill Surveys - Detect/non-detect surveys were conducted using tactile and visual surveys of substrate and aquatic vegetation for the presence of snails. Permanent transects required a more in-depth, random grid survey. The three transects identified for sampling were lower Maggie Creek and two sites on the Humboldt River downstream of the Maggie Creek confluence. The Maggie Creek transect was located at the Chestnut street bridge, at UTM 11T 576483 4508074. The first Humboldt transect was located at the HWY 287 bridge at UTM 11T 573519 4505835 and the second Humboldt transect was located several miles downstream at UTM 11T 570269 4498301.

Stakes on each bank marked the sample transect line that stretched across the stream, with the exception of the upper Humboldt River transect, which used a fence line that was on the upstream side of the bridge. The sampling grid, made up of nine-10 cm squares, was placed on the downstream side of the transect line at three locations; one meter from each bank and in the center of the stream. Three-10 cm squares were randomly chosen for sampling. Sampling consisted of scraping off the top layer of substrate within each square and placing it into a larger aquarium net to be rinsed of the fine sediments. The finished sample, consisting of three sampled squares per plot, was placed in a jar and preserved with isopropyl alcohol. Preserved samples were taken to the office and examined under a dissecting microscope at low power. Each sample was subdivided and individual snails were counted. This number was then extrapolated to calculate the number of snails per square meter.

Dewatering of Maggie Creek was achieved by Newmont Mine Co., diverting flows to a storage reservoir. Due to the available amount of storage space in the reservoir, there was only a two week window for the diversion.

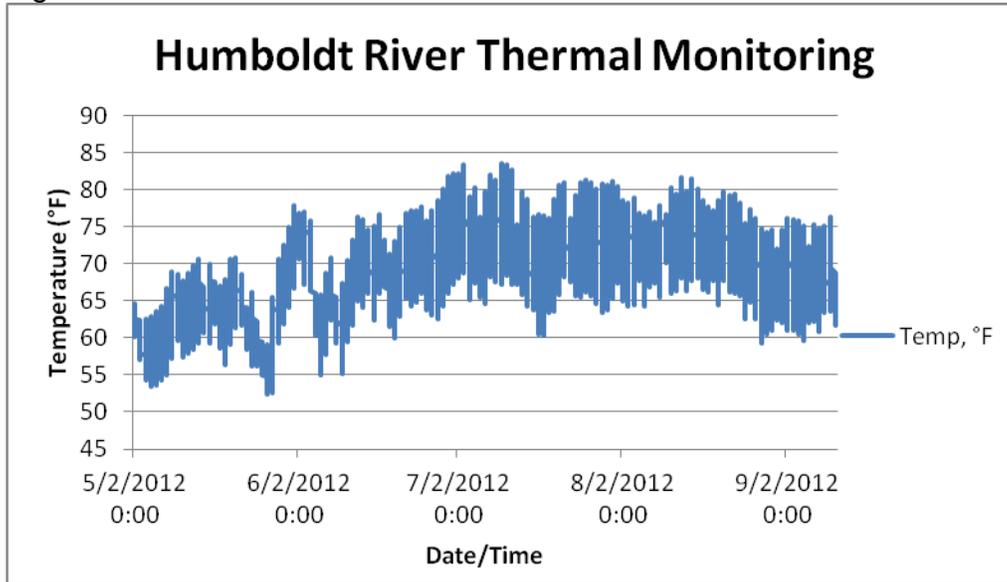
## **FINDINGS**

### Humboldt River

Humboldt River Survey – The Humboldt River was flowing cool to warm during the mid-September survey, with water temperatures ranging from 58°F to 77°F. During the survey, smallmouth bass, sunfish, Tahoe suckers, and carp were found. Smallmouth bass were found at all stations except Hum1 and Hum2 at an average length of 4.5 in (11.4 cm), with a range of 2.0 to 10.6 in (5.2 to 27.0 cm). Green sunfish were the only other game fish found that averaged 3.7 in (9.4 cm), with a range of 2.8 to 4.5 in (7.2 to 11.4 cm). The sunfish were found at all stations except Hum2 and Hum9. Carp were found at Hum3, Hum4, Hum6, and Hum9. The average length of carp was 10.5 in (25.8 cm), with a range of 3.7 to 25.4 in (9.4 to 64.6 cm). All fish were considered to be in good to excellent body condition.

Humboldt River Thermal Monitoring - The maximum daily temperature was 83.5°F on 7/10/12 and the minimum daily temperature was 52.4°F on 5/27/12. Several days in June and August had water temperatures exceeding 80°F. Figure 1 shows daily temperature readings.

Figure 1.



Opportunistic Angler Contacts – No anglers were contacted during three attempts to collect data.

#### South Fork Humboldt River

Spawning Monitoring –The upper South Fork Humboldt River, from Lucky Nugget causeway to the gauging station, was surveyed for redds to monitor for “spring spawning” trout. In total, 56 redds were found, with 9 being active. A total of 21 fish were documented and 2 spawning mortalities were also discovered.

Opportunistic Angler Contacts – The South Fork Humboldt River was checked for anglers four times during 2012. During these checks, 13 anglers were contacted. Anglers spent 26 hrs to catch 36 fish and averaging 22 in. Data indicates 2.8 fish per angler, 2.0 hrs fished per angler, and there was a catch rate of 1.4 fish per hour. Of the fish caught and measured, 57% was rainbow trout, while the other 43% was bowcutts.

#### Other Eastern Region Streams

Opportunistic Angler Contacts – No anglers were contacted on “other Eastern Region Streams” during 2012.

Mercury Collections – Brown trout were collected from Kingston Creek and redband trout were collected from the Bruneau River. Due to an oversight, the samples were not sent to the EPA lab for analysis.

McCoy Creek Electrofishing - There were 41 trout (brown trout and cutthroat x rainbow trout hybrids) caught during a single pass electroshocking survey. Flow was very high and an additional 15 trout were missed. Fin samples were collected from the hybrids for genetic analysis.

New Zealand Mudsnail Surveys - The upper distribution of mud snails on Maggie Creek was identified at approximately 5.5 mi upstream from its confluence to the Humboldt River. Just below this area, snails were observed in relatively low numbers and surveying about 100 yds upstream in the Humboldt River found no snails. Therefore, the distribution in the Humboldt River occurred downstream of Maggie Creek, which extended downstream for several miles below the Highway 278 Bridge.

On November 13, three transects were surveyed. The Maggie Creek transect was known to have NZMS, and based on prior visual surveys, was expected to have the highest density of snails. Three plots were set up, using three 10 cm squares per plot. The average density found was 28,733 snails per square meter, with a range of 400 to 61,266 snails per square meter (Table 1). Two variables that appear to influence the density of snails were substrate and water velocity. The left bank plot had very little flow and a heavy silt layer covered the gravel, while the center and right plots were predominantly silt, with varying levels of rooted vegetation. The main difference between the center and right bank plots was the amount of a dense, calcium crusted fiber layer covering the silt layer in the center plot. The density of snails was nearly 3 times higher in the center than the right bank, which was likely a result of increased flow and greater habitat area. Relatively few snails occurred in the slow flow and poor habitat of the left bank.

Table 1. Maggie Creek NZMS Transect.

Sample Location	Max Depth	Quadrants	Feet/sec	Substrate	Vegetation	NZMS	MS/m <sup>2</sup>	
Right	440	5,7,9	1.04	Silt	Rooted	736	24,533	
Center	320	3,6,9	1.37	Silt	Rooted	1838	61,266	
Left	90	2,3,8	NA	Gravel, silt	Rooted	12	400	
							28,733	Average

The upper Humboldt transect was also known to have NZMS, but at a lower density than in Maggie Creek. Three plots were set, sampling three squares per plot which resulted in an average snail density of 511 per square meter and a range of 300 to 633 per square meter (Table 2). The density of snails was much lower than those found in Maggie Creek, as was expected from earlier visual surveys. Again the lowest density of snails was found in an area of no to little flow and a heavy layer of silt covering beaver chewed sticks.

Table 2. Upper Humboldt NZMS Transect.

Sample Location	Max Depth	Quadrants	Feet/sec	Substrate	Vegetation	NZMS	MS/m <sup>2</sup>	
Right	130	5,6,9	0.79	Sand, gravel, silt	Rooted	18	600	
Center	460	1,5,6	0.82	Sand, gravel, silt	Rooted	19	633	
Left	200	5,7,8	NA	Silt, sticks	Rooted	9	300	
							511	Average

The lower Humboldt transect was not expected to have NZMS, based on observations made during a fish population survey conducted last October. Three plots were set, with three squares per plot being sampled, resulting in no NZMS found. Table 3 shows the survey summary. This substrate was predominantly sands and gravel, with some areas of vegetation.

Table 3. Lower Humboldt NZMS Transect.

Sample Location	Max Depth	Quadrants	Feet/sec	Substrate	Vegetation	NZMS
Right	235	2,3,9	1.85	Sand, gravel	No veg.	0
Center	125	1,7,9	0.87	Sand, silt	Clinging, rooted	0
Left	235	1,4,6	0.48	Sand, gravel	Rooted	0

Overall, this survey resulted in determining the upper distribution of NZMS and providing baseline data for future mud snail density comparisons. Yearly surveys should be implemented to track the expansion of this species over time.

Beginning on January 14, the water from the Newmont cooling towers was diverted to their storage reservoir. After a 3 hr lag, flows at the gauge dropped from 30 cfs to 10 cfs in a 7 hr period (Figure 2). The lower monitoring site was monitored following the water shutoff and water flow and temperature decreased. Two days later at this site, the water level rose due to beaver activity and the formation of a thin (1-2 in) layer of ice. On the day that water flow resumed to normal, the water level appeared to be stable and ice thickness increased to 3 to 4 in. The middle monitoring site was visited twice and showed a steady decrease in water flow and level. The area was frozen and snails were observed clustered under rocks that had been exposed from the dropping water level (Figure 3). This suggests there is the potential to kill NZMS as long as there is the ability to manipulate water flow. The project was partially successful, showing that combining reduced water flows with freezing temperatures can impact snail populations.

After eight days of drying, creek flow slowly dropped to 4.7 cfs, at which time it was decided to abort the project and resume discharge into the creek. The discharge pattern followed a gradual decrease that could take over a month for the creek to become totally dry. Unfortunately, the storage reservoir did not have the capacity to store the amount of water needed for extensive drying. Also, since Newmont began dewatering, the water table in this stretch of Maggie Creek raised approximately 6 ft, making bank recharge an unknown complication in fully drying out the creek.

Signs were purchased to inform anglers and the general public of NZMS presence and decontamination needs. Permission to post the signs in areas with documented NZMS presence is being sought from private landowners and the Nevada Department of Transportation.

Figure 2. Maggie Creek Discharge.

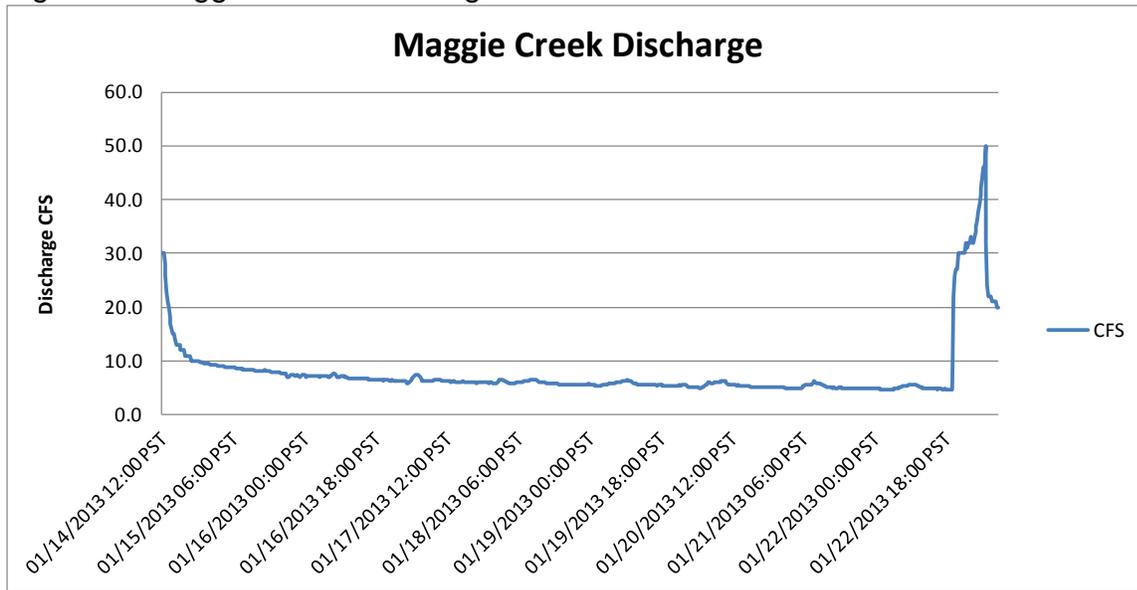


Figure 3. Desiccated and frozen NZMS.



## MANAGEMENT REVIEW

### Humboldt River

All objectives were completed for the Mainstem Humboldt River. General fishery assessment could be bolstered by some extra time spent on opportunistic angler contacts, perhaps by utilizing a creel clerk.

## South Fork Humboldt River

The spring spawning trout survey was completed in the spring of 2012; however, the fall 2012 brown trout spawning survey was not completed due to man-time being spent on Section 6 funded projects. Also, general fishery assessment could be bolstered by some extra time spent on opportunistic angler contacts, perhaps by utilizing a creel clerk.

## Other Eastern Region Streams

All objectives were completed.

### **RECOMMENDATIONS**

- Conduct a general fisheries assessment of the Humboldt River through opportunistic angler contacts.
- Visually monitor the spawning migrations of rainbow trout for three days during spring and brown trout for 3 days during fall at established transects on the South Fork Humboldt River above and below South Fork Reservoir.
- Conduct a general fisheries assessment of the South Fork Humboldt River through opportunistic angler contacts.
- Revise the South Fork Humboldt River Fisheries Management Prescription.
- Continue to collect sport fish species from Eastern Region streams/rivers for mercury analysis in cooperation with NDEP.
- Assess the status of non-native trout populations in McCoy Creek.
- Conduct a spring NZMS survey on lower Maggie Creek to assess the impacts that the dewatering attempt may have had on the population.
- Conduct a fall NZMS survey of the three transects to document any change in mudsnail densities and distribution.
- Make agency personnel aware that NZMS are in the area so they may be on the watch and to document findings.

Prepared by: Heath Korell  
Fisheries Biologist, Eastern Region

Michael Starr  
Fisheries Biologist, Eastern Region

Jeff Petersen  
Fisheries Biologist, Eastern Region

Date: February 2012