NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE SPORT FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORTS
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STREAMS AND RIVERS MANAGEMENT
EASTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL JOB PROGRESS REPORT

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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, 2018 through December 31, 2018*

SUMMARY

In the Humboldt River, New Zealand mud snail (NZMS) survey occurred for the seventh year to document presence and distribution. However, surveys did not appear to be very successful in determining presence and relative densities of NZMS. A new protocol should be found to improve identifying the presence of NZMS within the Humboldt River. NZMS movement is progressing downstream and it is expected their range will expand rapidly, particularly if spring runoff increases in response to good water years.

A 100 m single pass survey was conducted in the South Fork of the Humboldt River (SFHR) at ten stations using a Smith-Root LR-20B electroshocker. During the survey, 99 percent of the captured fish were endemic nongame species consisting of speckled dace (64%), Lahontan mountain/Tahoe sucker (23%), and redside shiner (13%). Game fish included rainbow trout (90%), smallmouth bass (5%), and channel catfish (5%). No brown trout were found, but spot-electroshocking efforts found several wipers between stations SFHR16 and SFHR17.

The upper SFHR from Lucky Nugget causeway to the gauge station was visited twice to monitor spring trout spawning (i.e., occurrence of redds). One day was also spent monitoring fall spawning trout above the reservoir, with no fish or redds found. Finally, the lower SFHR was surveyed once for observing fall spawning fish. None was found.

The SFHR upstream of the reservoir was checked for anglers three days in 2018 and one angler was contacted. This angler fished two hours and caught two fish. No anglers were observed below the reservoir.

Cleve Creek, Indian Creek, Eight Mile Creek, and smaller creeks within the Eastern Region were surveyed in 2018. Surveys provide detailed population and habitat information for protecting resources from projects such as mining, alternative energy, water diversions, development, etc. that possibly create harm within watersheds. Information dissemination about the sport fisheries also increases angling opportunities. Survey results showed stabile populations of rainbow trout and brown trout. Fish populations in Big Negro Creek and water quality in Illipah Creek were not sampled.

BACKGROUND

Humboldt River

Prior to 2012, Nevada was thought to have only two populations of New Zealand mud snails (*Potamopyrgus antipodarum*), one in the Salmon Falls River in northeast Nevada (Elko County), and the other in Lake Mead in southern Nevada (Clark County). In August 2012, Nevada Department of Environmental Protection identified what was thought to be New Zealand mud snails (NZMS) in Maggie Creek (Humboldt River drainage, Elko County) 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 extent being approximately three miles below the Newmont Mining Company cooling towers. All flow in this portion of the creek is provided by the 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. This invasive species continued to migrate downstream.

South Fork Humboldt River

Completion of the South Fork Reservoir Dam in 1988 essentially split the South Fork Humboldt River (SFHR, Elko County) into two sections. The upper river section above South Fork Reservoir to the highway bridge in Lee provided a fair sport fishery in the past. The primary limiting factors impeding trout survival includes the lack of suitable pools and protective cover due to stream channelization and willow eradication and critical increases in water temperature during summer resulting from reduced flow during the irrigation season. This section of river is now managed as a trophy fishery to provide some protection for the spring and fall spawning runs that emanate from the reservoir.

The lower river section downstream of South Fork Reservoir to the confluence with the Humboldt River has never maintained much of a fishery due to poor physical habitat conditions and poor water quality. Excessive livestock use has led to inadequate bank stability, lack of cover, insufficient pool development, and very high summer water temperatures. Subsequent releases from the reservoir have created the potential for a much improved sport fishery in the lower river. This not only improved water quality, but it essentially stocked the lower river with fish from the reservoir.

Other Eastern Region Streams

The north fork of Cleve Creek originates at an elevation of 10,100 feet on the east side of the Schell Creek Range (White Pine County). This fork converges with the main stem of Cleve Creek (occasionally called the south fork of Cleve Creek) that is dry and at an elevation of 6,650 ft elevation. The stream originates on land managed by the

U.S. Forest Service and flows on to checkerboard land controlled by either private landowners or Bureau of Land Management. Data files indicate that Cleve Creek was stocked with a variety of sport fish species (trout) since the early 1920s. A previous fish population survey conducted in 1992 found estimates for the north fork and main stem of Cleve Creek of 448 and 343 fish per mile, respectively.

Eight Mile Creek originates on the west side of the North Snake Range (White Pine County) at an elevation of 8,050 ft and flows approximately three miles into a small earthen impoundment. It then flows into a pipe that delivers the water to the ranch in the valley bottom. The stream flows entirely on land administered by the Bureau of Land Management. No stocking records could be located, but a 1953 report by T. Frantz stated that in 1943 local sportsman groups and the water right holder packed 10,000 rainbow trout up the stream for stocking. The stream was subsequently closed for two years to allow the population to establish. A 1977 report indicated this stream could serve well with a Bonneville cutthroat population; however, it never came to fruition.

Indian Creek also originates on the east side of the Schell Creek Range (White Pine County) at an elevation of 7,425 feet. It flows on land administered by the US Forest Service, through Bureau of Land Management administered land, and onto the valley bench, where it terminates into a private irrigation pond. It was historically stocked with rainbow trout, brook trout, and possibly brown trout, but there has been no stocking for several decades. A 1977 report suggests a hybrid cutthroat trout was present at the time of the survey. This hybrid could be one of two cutthroat trout varieties stocked during this time, either Yellowstone cutthroat or Bonneville cutthroat. The original survey in 1953 suggested that brook trout fingerling or “Snake Range” cutthroat (Bonneville cutthroat) should be stocked, but no records of this occurring could be located.

OBJECTIVES and APPROACHES

Objective: General Native Sport Fisheries Management

Approaches:

Humboldt River

- Visually inspect substrates for New Zealand mud snails (NZMS) below the lowest Humboldt River Drainage transect to assess downstream distribution.
- Sample two permanent transects utilizing grid frames in the Humboldt River in the fall to assess relative abundance of NZMS.

South Fork Humboldt River

- Electroshock historic sites on the South Fork Humboldt River below South Fork Reservoir to evaluate fish composition and densities.

- Visually monitor the spawning migrations of rainbow trout for three days during spring and brown trout for three days during fall at established transects above and below South Fork Reservoir.
- Conduct a general fisheries assessment through opportunistic angler contacts.

Other Eastern Region Streams

- Conduct a general fisheries assessment through opportunistic angler contacts.
- Conduct fish population surveys of Big Negro and Eight Mile Creeks (west side of the North Snake Range), and Cleve and Indian Creeks (east side of the Schell Creek Range).
- Monitor sedimentation levels of Illipah Creek using Imhoff cylinders.

PROCEDURES

Humboldt River

Detect/non-detect surveys for NZMS were conducted using tactile and visual sampling of substrate and aquatic vegetation. Survey transects required using an in-depth, random grid system. The three transects identified for surveying were located on the Humboldt River, downstream of the Maggie Creek confluence. The first transect was at coordinates 11T 561078 4492366 and the lower transect at 11T 557224 4492273.

The grid, made up of nine 10 cm squares, was placed on the downstream side of the transect line and two samples were collected one meter out from the right and left banks and one in the center of the river. Three 10 cm squares from within the grid were randomly chosen and sample collection consisted of removing the top layer of substrate within each square. A small aquarium net handle was used to scrape the sample into a larger aquarium net placed downstream of the square. The sample was then rinsed in the water to remove as much fine sediment as possible. The finished sample, consisting of contents from all three squares, was placed in a sample jar and preserved in isopropyl alcohol. Preserved samples were examined in the office under a dissecting microscope at low power. Each sample was subdivided and individual snails were counted. Snail abundance was reported as number per square meter.

South Fork Humboldt River

Fish Population Survey

Ten stations were sampled along the SFHR downstream of South Fork Reservoir. Stations SFHR7 through SFHR9, however, were not surveyed as the river had frozen over. A 100 m single pass electroshocking survey was conducted at each station using a Smith-Root LR-20B. All game fish captured were measured, weighed,

and released. Nongame, endemic fish were counted and released. Water temperature, air temperature, and pictures (upstream/downstream) were collected at each site.

Spawning Monitoring

During the spring and fall of 2018, transects were set up to survey trout redds on the South Fork Humboldt River to monitor spawning activity. Transects were located on upper river of the South Fork Reservoir, from the causeway to the gauging station, and about 0.5 mi below the dam. All transects were walked and visually surveyed by counting redds and fish.

Opportunistic Angler Contacts

Angler surveys were conducted in the spring and summer by a creel clerk as well as the biologist. Total fish caught and total hours fished per angler were recorded.

Other Eastern Region Streams

Opportunistic Angler Contacts

Angler contacts were attempted in the spring and summer by a creel clerk as well as the managing biologist. Total fish caught and total hours fished per angler were recorded.

Big Negro Creek (HUC 16010008)

No surveys were conducted this year at Big Negro Creek.

Cleve Creek (HUC 16060008)

To determine general fish abundance, a single pass method of electroshocking was utilized for at least 100 ft of stream at each station with an ETS ABP-3 backpack unit. The electroshocker was set to 100 v, with the duty cycle and frequency adjusted to 25%. Shocking efficiency was variable throughout the survey, with the best conditions found in the lower reaches of the stream. In the upper elevations, where discharge and gradient were higher, shocking efficiency was considered poor. General habitat features were visually observes and noted during the survey, but no measurements were taken.

Eight Mile Creek (HUC 16010008)

The same method for sampling fish and observing habitat conditions at Cleve Creek were used at Eight Mile Creek. Shocking efficiency was considered good at all stations surveyed.

Illipah Creek (HUC 16060007)

Sediment was not monitored in the creek during 2018.

Indian Creek (HUC 16010008)

The same method for sampling fish and observing habitat conditions at Cleve and Eight Mile creeks were used at Indian Creek. Shocking efficiency was variable throughout the survey, with the best shocking conditions found along the lower reaches.

FINDINGS

Humboldt River

NZMS Detect/Non-Detect Surveys

Detect/non-detect surveys were conducted in conjunction with other work activities in 2018 and no NZMS were found. However, a BLM biologist reported NZMS in upper Maggie Creek, which, upon further investigation was verified. NZMS were previously found below Newmont Mine Cooling towers, but now they occur above the towers near the confluence of Cottonwood Creek. Maggie Creek is popular with waterfowl and, because of this, it is expected that NZMS will continue to disperse.

Transect Monitoring

As the density of NZMS at the original transects along Maggie Creek continues to increase, NZMS will continue to exist and spread in the Humboldt River. For this reason, surveys have shifted farther downstream in the Humboldt River. The upper Humboldt River transect was first surveyed in 2015, with no NZMS observed. In 2016, this same transect produced four NZMS, the 2017 survey produced two, and the 2018 survey found one. There appeared to be no connection between NZMS density and substrate type (Table 1). However, low detection may suggest our ineffectiveness to locate them and it may be better to evaluate the presences of NZMS by using a more detailed methodology that examines density.

The location between Barth Pit (an old iron mine turned reservoir) and Beowawe was first surveyed in 2016, finding only one NZMS. The 2017 and 2018 surveys found no snails and none were observed during visual surveys of aquatic vegetation and substrate in the vicinity (Table 2). Again, it appears that this survey technique was inadequate for the detection of NZMS when in lower densities and the approach to these surveys should be reevaluated.

With the overall low densities being found in these surveys over the last several years, it is apparent that a new survey protocol should be used to document the presence of NZMS in the Humboldt River. NZMS are obviously progressing downstream and it is expected their range will expand more rapidly, particularly if spring

runoff increase in response to good water years. Yearly surveys should continue to move farther downstream in the Humboldt River in an attempt to track NZMS expansion.

Table 1. Upper transect survey summary.

Sample Location	Avg. Depth (m	Quadrants	Substrate	Vegetation	NZMS	MS/m²	
Left	0.58	6,9,1	5%B, 20%C, 10%G, 65%S/S	None	0	0	
Center	0.25	8,6,2	10% C. 10%G, 80% S/S	Clinging	0	0	
Right	0.21	6,7,4	10% Veg, 90% S/S	Beaver chews	1	33	
** No snails observed in vegetation or on substrate near transect						11 MS/m²	Average

Table 2. Lower transect survey summary.

Sample Location	Avg. Depth (m	Quadrants	Substrate	Vegetation	NZMS	MS/m²	
Left	0.24	3,1,5	60% C, 25% G, 15% S/S	Clinging	0	0	
Center	0.38	1,2,9	60% C, 30% G, 10% S/S	Clinging	0	0	
Right	0.32	5,6,8	50% G, 40% S/S, 10% veg	Clinging/Rooted	0	0	
** No snails observed in vegetation or on substrate near transect						0 MS/m²	Average

South Fork Humboldt River

South Fork Humboldt River Survey

The lower SFHR was flowing clear to muddy with temperatures ranging between 39 and 59°F. During the survey, 99 percent of the captured fish were nongame species consisting of speckled dace (64%), Lahontan mountain/Tahoe sucker (23%), and redside shiner (13%). Game fish included rainbow trout (90%), smallmouth bass (5%), and channel catfish (5%). No brown trout were found, but spot-electroshocking efforts found several wipers between stations SFHR16 and SFHR17. Rainbow trout averaged 10.3 in (26.2 cm) with a range from 4.8 to 17.2 in (43.6 to 10.6 cm). The catfish was 23.0 in (58.5 cm), with a weight of 7 lbs 4 oz and the smallmouth bass had a length of 3.4 in (8.6 cm). Table 3 summarizes the location and total number of fish captured.

Table 3. SF Humboldt River fish survey summary.

Species	Individuals Captured	Station (SFHR#)
Rainbow Trout	18	5-6, 14-16
Smallmouth Bass	1	15
Channel Catfish	1	14
Speckled Dace	1391	5-6, 10-14, 16-17
Sucker (Mountain/Tahoe)	496	5-6, 10-16
Redside Shiner	287	5-6, 10-16

In terms of habitat, the majority of the lower SFHR was in poor condition, showing improvement only at a few sites (SFHR14, SFHR16, and SFHR17). Quality pools, bank stability, stream shading, instream structure, and stream width/depth ratios were the major limiting parameters. Very few willows were found and the only other

woody species documented was a few transplanted cottonwood trees. Transplanted trees provide bank stability and a good source of shade, however, no natural propagation was found. Several species of thistle, cheatgrass, knapweed, whitetop, and other invasive species were found throughout the river corridor. Photos of riparian conditions were collected at all survey stations.

The SFHR has the potential to support a trophy fishery and sustain excellent habitat for an expansive array of wildlife species, but several challenges stand in the way. A full-scale restoration of the riparian would extremely expensive and several conservation easements/agreements would be needed. Grazing impacts would also need to be assessed and addressed prior to the riparian enhancement. Instream habitat structures such as boulder check dams and beaver analogs would benefit the fishery. Invasive weeds found throughout the watershed should be chemically treated by the land management agencies, private landowners, and through partner programs with local, state, and federal agencies. Water temperature should be monitored throughout the lower SFHR using thermographs. It is not recommended any fish species be stocked since the habitat is currently limited and fish get flushed downstream from South Fork reservoir. Additionally, stations SFHR7 through SFHR9 as well as SFHR1-SFHR4 (Maggie Creek Ranch) should be thoroughly surveyed to document habitat conditions and assess fish species composition.

Spawning Monitoring

The upper SFHR from the Lucky Nugget Causeway to the gauging station was surveyed for spring spawning trout on March 13 and April 3. During the March survey, three fish were observed but no redds or mortalities were documented. The April survey found 36 spawning trout and 25 active redds, most likely rainbow trout. The river above the reservoir was also surveyed for fall spawning fish (primarily looking for brown trout) on November 11, with no redds or fish found. The area below South Fork Reservoir was surveyed again on November 24 and again, no spawning redds or trout were observed.

Opportunistic Angler Contacts

The South Fork Humboldt River above South Fork Reservoir was checked three times and one angler was contacted. This angler fished for two hours and caught two fish. The Lower SFHR was checked on four different occasions with no anglers being contacted.

<u>Other Eastern Region Streams</u>

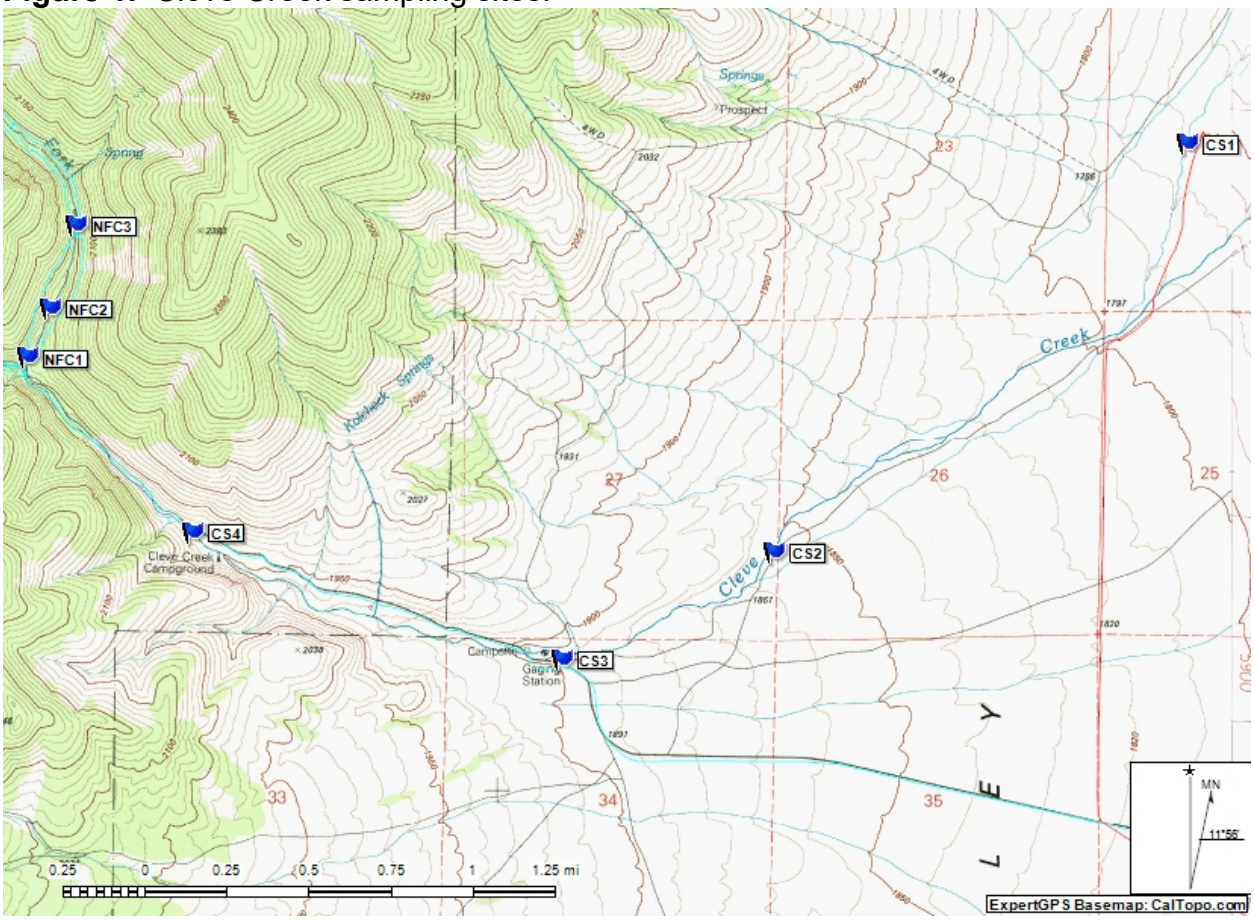
Opportunistic Angler Contacts

Cleve Creek was surveyed four times, with no anglers being contacted. Kalamazoo Creek, north of Cleve Creek in the Shell Creek Range, also was check twice, but no anglers were contacted.

Cleve Creek Fish Population Survey

Cleve Creek was surveyed at seven sites, four along the mainstem and three on the north fork (Figure 1). Perennial flow occurred from the north fork throughout the main stem, which was surprising given the poor winter snowpack and lack of runoff in 2018. At survey site CS1, the stream was narrow, channelized, and had 100% willow canopy cover. Previous lack of water likely contributed to no fish being captured or observed at this station. At CS2, approximately one mile upstream of CS1, previous beaver activity improved fish habitat and approximately 20 fish, appearing to be brown trout, were missed while surveying. The pools were too deep to effectively electroshock and capture fish. At this site, there was 100% canopy cover with a good mix of rubble, gravel, and cobble substrate. The beaver activity appeared to be over a year old.

Figure 1. Cleve Creek sampling sites.



CS3 was just downstream of the BLM campground where NDOW stocks 1,000 rainbow trout annually. Sampling produced one brown trout that was 160 mm (6.2 in) and another six brown trout escaped due to the swift current. This station was comprised of mostly riffle habitat with some small pooling caused by larger rubble substrate or the occasional debris jam. CS4 was the last station on the main stem and it produced the best sampling results, 10 brown trout were caught and an additional six

brown trout escaped. Measurements of nine trout averaged 69 mm (2.7 in) with the tenth measuring 145 mm (5.7 in).

The North Fork of Cleve Creek occurred at a higher gradient and combined with vegetation caused netting fish significantly more difficult. Between NFC1 and NFC4, numerous fish were contacted, but only one brown trout measuring 161 mm (6.3 in) was captured at NFC1. Of the fish contacted, many appeared to be young-of-year that were spawned in the fall of 2017 and generally from 45 to 75 mm (1.7 to 2.9 in). The habitat appeared to be better than along the main stem, with more pool structure being found. However, it was relatively shallow. If pools were rated using the General Aquatic Wildlife Survey (GAWS), they mostly would be Class 4, with some rated as Class 3. The GAWS categorizes pools from Class 1 (high quality) to Class 5 (low quality).

Average fish abundance on the main stem (CS1 through CS4) was 721 fish per mile and on the north fork (NFC1 through NFC3) was 299 fish per mile. All fish captured were brown trout. Since sampling was difficult throughout the entire stream, many fish were missed. However, the documentation of several size classes and recruitment of a wild population of brown trout suggest there is a stabile fishery and quality habitat.

Habitat and water does not appear to be a limiting factor for fish in Cleve Creek. The few remaining beaver provide substantial habitat structure for fish and increase fishing opportunity for anglers. Most interesting, though, was that only one rainbow trout was contacted, but outside of established transects. Since 1,000 rainbow trout are stocked each year, it is surprising that more were not found. Note, however, that stocked rainbow trout are not meant to carryover and provide a sustainable fishery; it is specifically a put-and-take fishery. In recent years, anglers have commented there was too many hatchery trout, but survey findings indicate stocked trout likely do not survive long and the fishery is sustained by a wild population of brown trout. The survey was valuable in documenting the behavior of the fishery and for use in providing appropriate management recommendations for habitat development and trout stocking.

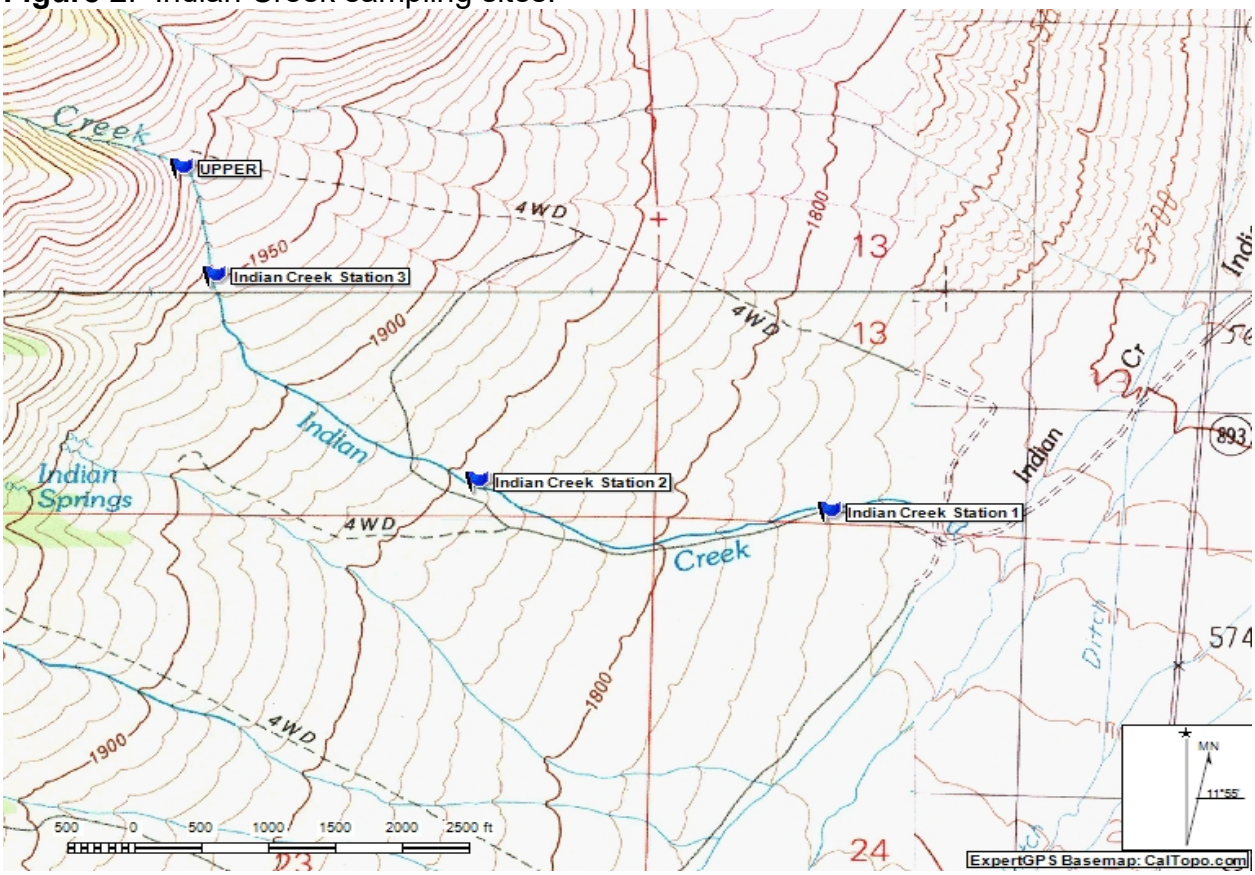
Indian Creek Fish Population Survey

Three sites were surveyed at Indian Creek (Figure 2). Creek discharge likely fluctuated little, evident from the narrow channel (less than two feet wide) and riparian area along the majority of the stream. Channel width and water width ranged from 1.0 ft (at ICS1) to 3.5 ft (at ICS3). At ICS1 and ICS2, the dominant bank cover was comprised of grasses, with only a few forbs present for 100% canopy cover. At ICS3, bank cover changed and was dominated by coyote willow and rose. However, the canopy cover dropped to 60% due to the type of vegetation.

Bank soil stability followed suit with bank cover and canopy cover. Bank soil stability was excellent at ICS1 and ICS2, and fair at ICS3. The difference at ICS1 was mainly due to a change in vegetation type, but there was also notable ungulate damage that lowed the rating. The stream bottom was not visible at ICS 1 and ICS2 without

manipulating the vegetation. The substrate consisted mainly of gravel, with some light sand/silt at each of the lower stations. At ICS 3, the substrate changed to rubble, with some gravel and an occasional boulder. Pool habitat was poor throughout the surveyed portion of the stream.

Figure 2. Indian Creek sampling sites.



Brook trout were captured at ICS1 and ICS2, while none was caught at ICS3. It was unclear if no fish were present or if sampling was missing fish due to the electroshocker malfunctioning. Brook trout comprised 100% of the catch, with abundances of 369 fish/mi and 105 fish/mi at ICS1 and ICS2, respectively. The average abundance for the surveyed area of stream was 158 fish/mi. The average length for nine brook trout was 2.9 in (74 mm), with a range from 2.6 in (66 mm) to 4.8 in (122 mm). Since there was concern about the electroshocker performance, the survey ended after ICS3. Attempts at spot shocking above ICS3 yielded two more brook trout, measuring 5.2 in (132 mm) and 7.9 in (203 mm). At that point, the electroshocker completely stopped working. Figure 2 shows the end of sampling marked as “Upper” with a blue flag.

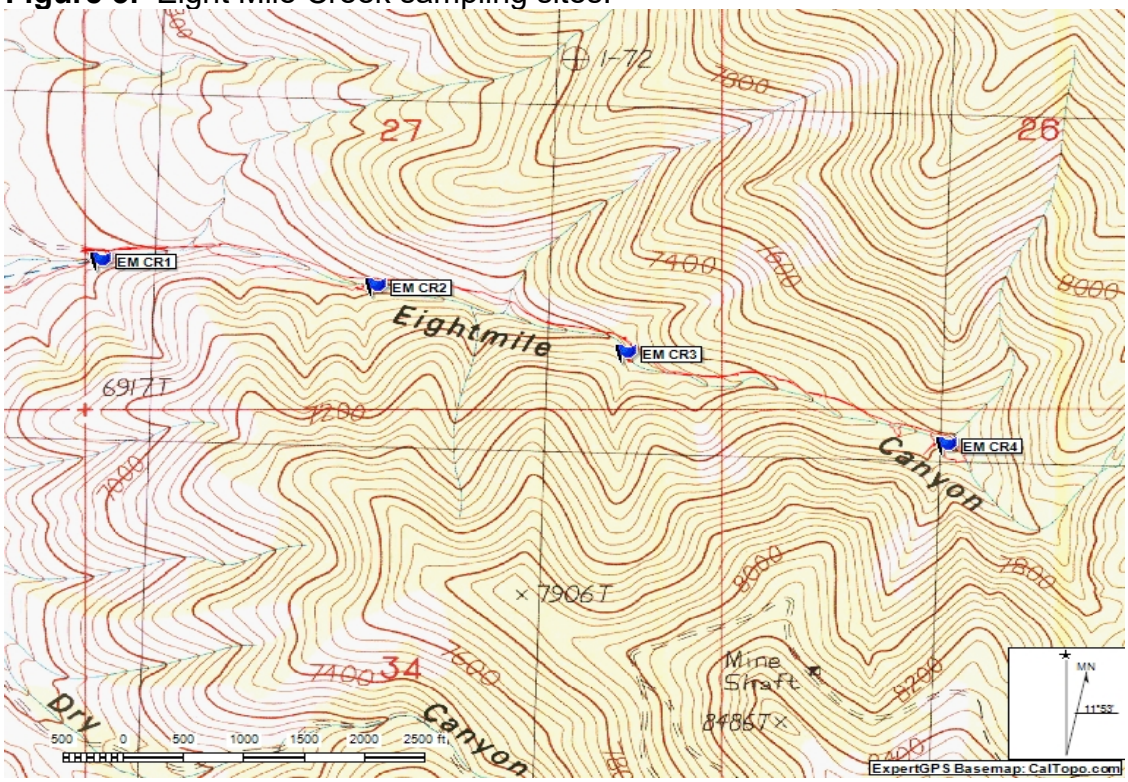
This survey was the first on Indian Creek in 35 years. Basic habitat and fish population information will allow managers to work with habitat management agencies to address overgrazing issues and comment on future habitat projects in the vicinity of the stream. Finding the numbers of the fish that were found was surprising given the

lack of sampling and lack of angler use. A small proportion of the angling community enjoys small stream fishing that streams such as Indian Creek provide. This survey will allow for better communication with the angling public in suggesting locations of small stream fishing that they may enjoy.

Eight Mile Creek Fish Population Survey

Eight Mile Creek was sampled at four sites (Figure 3). Annual fluctuation in flow, i.e., spring discharge, is based on the amount of snowpack that infiltrates into the mountain aquifer. The drainage basin is small, where rain on snow events can be captured in the small earthen pond and piped to a ranch on the valley floor. The stream is relatively narrow from the headwaters to the pond, ranging from 1.5 to 3.0 feet wide. The dominant bank cover at EMCR1 was coyote willow, along with some interspersed grasses and forbs. Dominant bank cover from EMCR2 to EMCR4 included an assortment of choke cherry, coyote willow, water birch, and rose. At each station, bank soil stability was considered fair by having shallow, discontinuous root mats and steep upper banks. Canopy cover was poor at EMCR1 at 54%, with the remaining stations reaching 100% due to the presence of dense willow and water birch. Stream substrate type varied, with EMCR1 and EMCR2 having larger gravels and mostly rubble. Portions of stream bottom, too, were cemented, caused by calcium carbonate deposits. At EMCR3 and EMCR4, smaller gravels and a mix of small and large rubble made up the majority of the substrate. These upper stations provided what appeared to be the best spawning habitat along the stream.

Figure 3. Eight Mile Creek sampling sites.



Rainbow trout were captured at all stations and were most abundant at EMCR1 and EMCR2 due the presence of a small earthen pond at the end of the stream. Fish abundance, including known missed fish, averaged 277 fish per mile. Only one fish was missed during this survey, a juvenile that escape downstream prior to sampling. The 20 rainbow trout captured averaged 3.3 in (84 mm) and ranged from 1.6 in (42 mm) to 6.1 in (156 mm). Fish occurred all the way to the origin of the headwaters on Eight Mile Creek. The original fish were likely stocked in the 1940s.

This basic habitat and fish population information will allow managers to work with habitat management agencies to address overgrazing issues and to comment on future habitat projects in the vicinity of the stream. One unanticipated observation coming from this survey was the documentation of springsnails *Pyrgulopsis*. Finding the numbers of the fish that were found was surprising given the lack of stocking history of the stream and lack of angler use. A small proportion of the angling community enjoys small stream fishing that streams such as Eight Mile Creek provide. This survey will allow for better communication with the angling public in suggesting locations of small stream fishing that they may enjoy.

MANAGEMENT REVIEW

Humboldt River

All objectives were completed in 2018, with this being the seventh year of surveys for NZMS in the Humboldt River system. As this invasive species continues to spread, it is important that public awareness and cooperation continue to be an essential tool in reducing the impacts of NZMS and all invasive species.

South Fork Humboldt River

A fishery assessment survey (below the reservoir) and spring and fall trout spawning surveys were completed in 2018. An angler creel survey was also completed, but contacts could be bolstered during the summer by utilizing a creel clerk.

Other Eastern Region Streams

Two objectives were not completed in 2018; sampling sediments at Illipah Reservoir and surveying the fishery on Big Negro Creek due to time constraints and other work priorities. Surveys that were completed were the first surveys in over two decades conducted on these streams. The information gained from these surveys will provide added knowledge and updated information on the health of these streams.

RECOMMENDATIONS

- To conduct a general fisheries assessment of the Humboldt River through opportunistic angler contacts.

- To visually monitor spawning use of rainbow trout for three days during spring and brown trout for three days during fall at established transects on the South Fork Humboldt River above and below South Fork Reservoir.
- To conduct a general fisheries assessment of the South Fork Humboldt River through opportunistic angler contacts.
- To assess the status of non-native trout populations in Eastern Region streams through electroshocking surveys.
- To conduct visual/tactile surveys downstream of the lowest transect site to evaluate the spread of NZMS.
- To conduct detect/non-detect surveys for NZMS in conjunction with other work activities.
- Due to inconsistent monitoring, sediment sampling on Illipah Creek should be discontinued until a future time that a study can be put together.

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