NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE SPORT FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORT

F-20-54
2018

Urban Sport Fisheries
SOUTHERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT

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NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Southern Region Urban Sport Fisheries Management*
Period Covered: *January 1, 2018 through December 31, 2018*

SUMMARY

The urban fishing ponds in the Southern Region support put-and-take fisheries of rainbow trout *Oncorhynchus mykiss* and channel catfish *Ictalurus punctatus*. Additionally, some ponds support populations of largemouth bass *Micropterus salmoides* and various sunfish species *Lepomis* spp. Current regulations allow anglers to harvest three fish of any species. In 2018, 73,533 rainbow trout were stocked among the urban ponds. These fish averaged 9.5 in (241 mm) TL and 2.9 fish/lb. During the warmwater season, 8,479 channel catfish were stocked, averaging 0.46 f/lb and 18.6 in (472 mm) TL.

Contact creel surveys were carried out 11 days, with two to four ponds visited on each survey day. Surveys were conducted monthly at urban ponds, except for July and September. Some ponds were sampled twice in January. A total of 328 anglers were contacted, reporting 251 fish caught. Fish included 138 rainbow trout, 106 channel catfish, 5 bluegill *L. macrochirus*, 1 largemouth bass, and 1 common carp *Cyprinus carpio*. Overall, catch rates were 0.4 fish/hour and 0.8 fish/angler. By species, rainbow trout made up 55% of the catch, channel catfish 42%, bluegill 2%, largemouth bass 0.4%, and common carp 0.4% of the catch. Angler catch rates were within the acceptable range, though fish/angler rates were below targeted rates of 1.0 to 1.5 fish/angler, except for Boulder City Pond where anglers had a catch rate of 1.4 fish/angler. Because of the small amount of effort put toward creel surveying, creel data may not fully reflect the amount of angler use and harvest occurring at these ponds.

BACKGROUND

There are seven urban fishing ponds in the Southern Region. They include Sunset Park Pond, Boulder City Fishing Pond, Lorenzi Park Pond, Tule Pond (Floyd Lamb Park), the Mesquite Urban Pond (Hafen Pond), Cold Creek Pond, and the Beatty Pond. These ponds are a popular alternative to traditional fishing and provide a nearby urban fishing environment. Ponds are managed mainly as put-and-take fisheries with stocked rainbow trout during the coldwater season and channel catfish during the warmwater season. Some ponds have naturally recruiting populations of largemouth bass and sunfish. Occasional stocking of bluegill occurs at some of the ponds to provide additional angling opportunity and to provide forage for other fishes.

Sunset Park Pond

Sunset Park Pond is approximately 14 acres located in the southeastern Las Vegas Valley and managed by Clark County Parks and Recreation Department. This pond has a maximum depth of 10 to 12 ft. Rainbow trout and channel catfish are stocked seasonally, and bluegill is stocked occasionally. Other fish common in Sunset Park Pond include common carp and largemouth bass. While not stocked by NDOW, these fish have developed reproducing populations.

Boulder City Park Pond

Boulder City Park Pond is approximately three acres with a maximum depth of 15 ft. This pond is located at the Veterans Memorial Park in Boulder City and is operated by the City of Boulder City. It is stocked seasonally with rainbow trout and channel catfish. Bluegill is occasionally stocked as well.

Lorenzi Park Pond

Lorenzi Park Pond is another small pond of approximately three acres in size. It is located in northwest Las Vegas and is operated by the City of Las Vegas. This pond has a maximum depth of 10 ft. Rainbow trout and channel catfish are stocked seasonally. Some largemouth bass and other panfish species are known to inhabit the pond, but are not stocked by NDOW.

Tule Pond (Floyd Lamb Park)

Tule Pond is a spring-fed pond located in the Floyd Lamb Park in the northwest part of Las Vegas. This pond is approximately five acres with a maximum depth of 15 ft. The pond is currently maintained by the City of Las Vegas. Rainbow trout and channel catfish are stocked seasonally. The pond supports other species including largemouth bass, bluegill, green sunfish *L. cyanellus*, and redear sunfish.

Mesquite Pond (Hafen Park)

Mesquite Urban Pond is one of the smallest of the Southern Region urban ponds at approximately two acres. This pond is located in the town of Mesquite at Hafen Lane Park. It is stocked with rainbow trout in the coldwater season and channel catfish in the warmwater season.

Cold Creek Pond

Near Indian Springs, Cold Creek Pond is a small spring-fed pond north of Mount Charleston in Clark County. The pond is less than two acres and has a maximum depth of eight feet. It is stocked with rainbow trout in winter months.

Beatty Pond

The Beatty Pond is located in the town of Beatty in Nye County. The pond is located at Highway 95 and Vanderbilt Road, and used to be part of a gravel pit operated by the Nye County Road Department. The pond is spring fed from a shallow well with cattails along its edges. It is stocked with rainbow trout during the winter months and is managed as a coldwater put-and-take fishery. This pond also has resident largemouth bass and channel catfish from previous stockings sometime after its construction in 1977.

OBJECTIVES and APPROACHES

Objective: To administer an urban fisheries program, which assesses fisheries resources or potentially new fisheries resources, identifies and addresses habitat management needs, manages fish stocking to meet fishery objectives, provides information to anglers, and maintains contact with the managing entities.

Approaches:

- Conduct a general fisheries assessment through direct angler contacts at least once monthly at all managed sites except Mesquite (Hafen Park), Cold Creek, and Beatty ponds.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity).
- Evaluate annual stocking recommendations based on habitat conditions and angler use.
- Coordinate rainbow trout stocking at all sites during cool-weather months (November through March).
- Manage contracts for and coordinate stocking of purchased channel catfish at all sites during warm-weather months (April through October).
- Coordinate fishery management activities with the City of Las Vegas, City of Boulder City, City of Mesquite, and Clark County, as necessary to maintain/enhance the fishery and address observed site management needs.
- Identify and/or develop additional urban fishing waters in cooperation with local government entities as opportunities arise.

PROCEDURES

General Fisheries Assessment

Creel surveys were conducted at Sunset Park Pond, Lorenzi Pond, Tule Pond, and Boulder City Pond monthly (except July and September), for a total of 11 days, contacting 328 anglers. Broken down by site, Sunset Park Pond was surveyed on 11 occasions, Lorenzi on 9, Tule on 11, and Boulder City Pond on 9. No creel survey was conducted at the Mesquite Urban Pond, Cold Creek Pond, or Beatty Pond. Survey information collected included total catch, unit of effort, and species caught.

General Habitat Assessment

General habitat assessments were made through visual observations during creel survey and stocking days. Occasionally, a YSI model 556 MPS multi-parameter water quality meter was used to obtain temperature, conductivity, dissolved oxygen, and pH.

Rainbow Trout Stocking

Rainbow trout stocking was initiated on January 3 and continued through March 13. Stocking then resumed November 18 through December 13. Rainbow trout were stocked two to three times per month at the larger ponds. Lorenzi, Mesquite, Beatty, and Cold Creek ponds are smaller and are stocked less frequently (Table 1). Urban ponds received 73,533 rainbow trout (24,794 lbs) in 2018 (Table 2). Trout averaged 9.5 in (241 mm) TL and 2.9 fish/lb. These fish were reared at and transported from Mason Valley Fish Hatchery and Spring Creek Rearing Station.

TABLE 1. Rainbow trout stocking frequency by pond and month, 2018.

	Pond						
	Beatty	Boulder City	Cold Creek	Tule	Lorenzi	Mesquite	Sunset
January	1	3	0	2	2	1	3
February	1	2	0	2	1	2	2
March	0	0	2	2	1	0	1
November	1	2	1	2	1	1	2
December	0	2	0	2	1	1	2
Total	3	9	3	10	6	5	10

TABLE 2. Location, number of fish, pounds, average total length, and average fish/lb of rainbow trout stocked to southern Nevada urban ponds, 2018.

Urban pond	Number of rainbow trout	Pounds	Average length (inches)	Average fish/lb
Boulder City Pond	14,894	5,100	9.4	3.0
Sunset Pond	19,032	6,216	9.5	3.0
Lorenzi Park Pond	8,652	3,000	9.4	3.1
Tule Pond (Floyd Lamb Park)	21,833	7,300	9.5	3.0
Mesquite Pond (Hafen Park)	3,574	1,193	9.2	3.3
Cold Creek Pond	3,017	1,075	9.4	3.1
Beatty Pond	2,531	910	9.7	2.8
Total	73,533	24,794		
Average			9.5	2.9

Channel Catfish Stocking

Channel catfish stocking commenced on April 18 and ended October 24. Fish were stocked on a monthly basis, except in July. Due to high mortality rates from excessive temperatures in July, both NDOW and the vendor agreed to postpone stocking and resume in August. Mesquite Pond was stocked four times, every other month starting in April. In 2018, 8,479 channel catfish (18,625 lbs) were stocked among

the urban ponds, averaging 0.46 fish/lb and 18.6 in (472 mm) TL. Sunset Park Pond and Tule Pond received the largest allotment of 3,454 and 2,650, respectively (Table 3). Boulder City Pond received 1,453 fish, Lorenzi Park Pond 746, and Mesquite Pond 176 due to their smaller sizes and reduced angling pressure. Channel catfish were purchased from April through June from Moody Fish located in Arkansas. The contract expired after June and, therefore, Brown's Fish Farm and Supply from Yuma, AZ became the new vendor that stocked channel catfish from August through October.

TABLE 3. Location, number of fish, pounds, average length, and average fish/lb of channel catfish stocked in southern Nevada urban ponds, 2018.

Urban Pond	Number of channel catfish	Pounds	Average length (in)	Average fish/lb
Boulder City Pond	1,453	3,047	18.5	0.47
Sunset Pond	3,454	7,831	18.5	0.47
Lorenzi Pond	746	1,580	18.5	0.47
Tule Pond	2,650	5,767	18.5	0.47
Mesquite Pond	176	400	18.8	0.44
Total	8,479	18,625		
Average			18.6	0.46

Bluegill Stocking

Three stockings of bluegill were made among urban ponds by Brown's Fish Farm and Supply. On June 9, 1,500 bluegill were stocked in Boulder City Pond for Free Fishing Day and on October 24, 1,000 bluegill were stocked in Sunset Pond and 500 in Tule Pond.

Development of Urban Fisheries

No additional ponds were identified or developed in 2018.

FINDINGS

Contact creel surveys were carried out 11 days among the urban ponds, contacting 328 anglers who reported catching 251 fish during 651 hours. Fish were comprised of 138 (55%) rainbow trout, 106 (42%) channel catfish, 5 (2%) bluegill, 1 (0.4%) largemouth bass, and 1 (0.4%) common carp. Overall, catch rates were 0.39 fish/hr and 0.77 fish/angler (Figure 1 and Figure 2). Because of the low number of creel survey days, angler use and success may be higher than that observed.

The overall observed angler success (Figure 1) was midway between the upper target of 0.5 fish/hr and the lower target of 0.25 fish/hr as defined by NDOWs Urban Fishery Management Concept. Individually, surveyed ponds had catch rates within the target values, except for Boulder City Pond, which was above the upper target catch rate (Figure 1). The average fish caught per angler was below target success rates of 1.0 to 1.5 fish/angler at all ponds, except for Boulder City Pond where anglers caught on average 1.4 fish/angler (Figure 2).

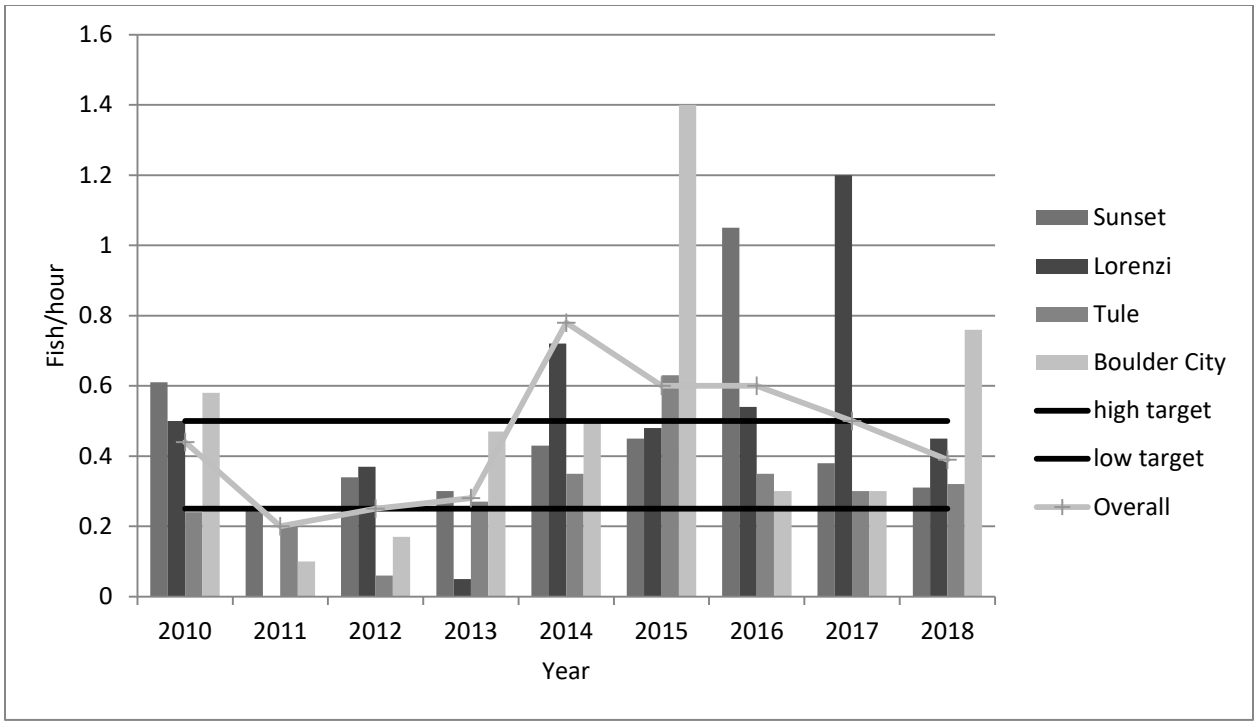

FIGURE 1. Urban pond catch rates (fish/hour) with target success rates (horizontal lines) identified in NDOW's Urban Fishery Management Concept, 2010 - 2018.

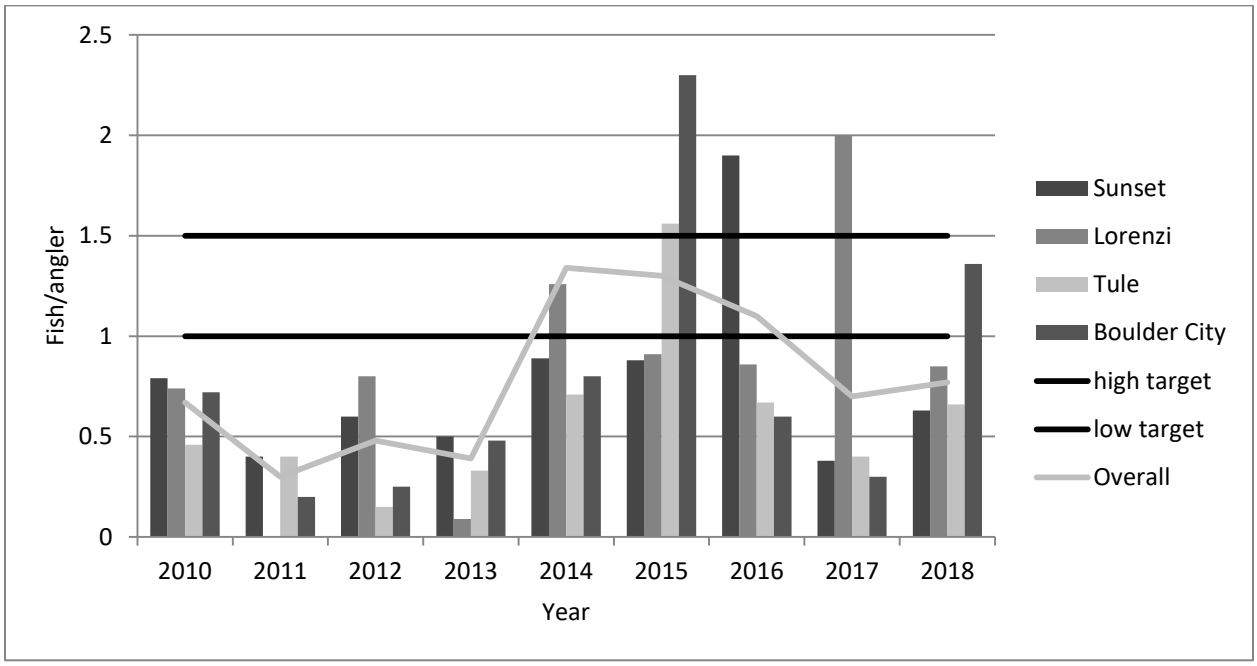

FIGURE 2. Urban pond catch rates (fish/angler) with target success rates (horizontal lines) identified in NDOW's Urban Fishery Management Concept, 2010 - 2018.

In addition to monthly surveys, mail-in angler questionnaire data was used to assess angler use and success. Each year, the previous year's angler questionnaire data becomes available, so the current angler questionnaire data is from 2017. Larger

ponds typically receive the highest number of anglers. In 2017, Sunset Park and Tule ponds had the highest number of anglers, though at Sunset Park Pond, numbers dropped from last year. The number of anglers at Boulder City and Lorenzi ponds also declined from 2017 to 2016 and angler use at smaller ponds (Mesquite, Beatty, and Cold Creek) remained low (Figure 3).

Angling pressure (number of total [expanded] fishing days, Figure 4) at Sunset and Tule ponds showed the highest in 2017. Sunset Pond received nearly 10,000 more angler-days than reported in 2016 and Tule Pond over 17,000. The remaining ponds received relatively low use, but were similar or slightly lower in 2017 than in 2016.

Smaller ponds (Lorenzi, Beatty, and Cold Creek) had the highest average catch rates at 2.86, 2.27, and 2.18 fish/day, respectively (Figure 5). Success at these ponds was well above the upper target catch rate of 1.5 fish/day. While Sunset Pond had a lower catch rate (1.36 fish/day), it was still within target area of 1.0 to 1.5 fish/day (Figure 5). Boulder City, Tule, and Mesquite ponds fell short of the objective. These rates, however, were much improved over the observed catch rates from contact creel surveys in 2017 (see Figure 2).

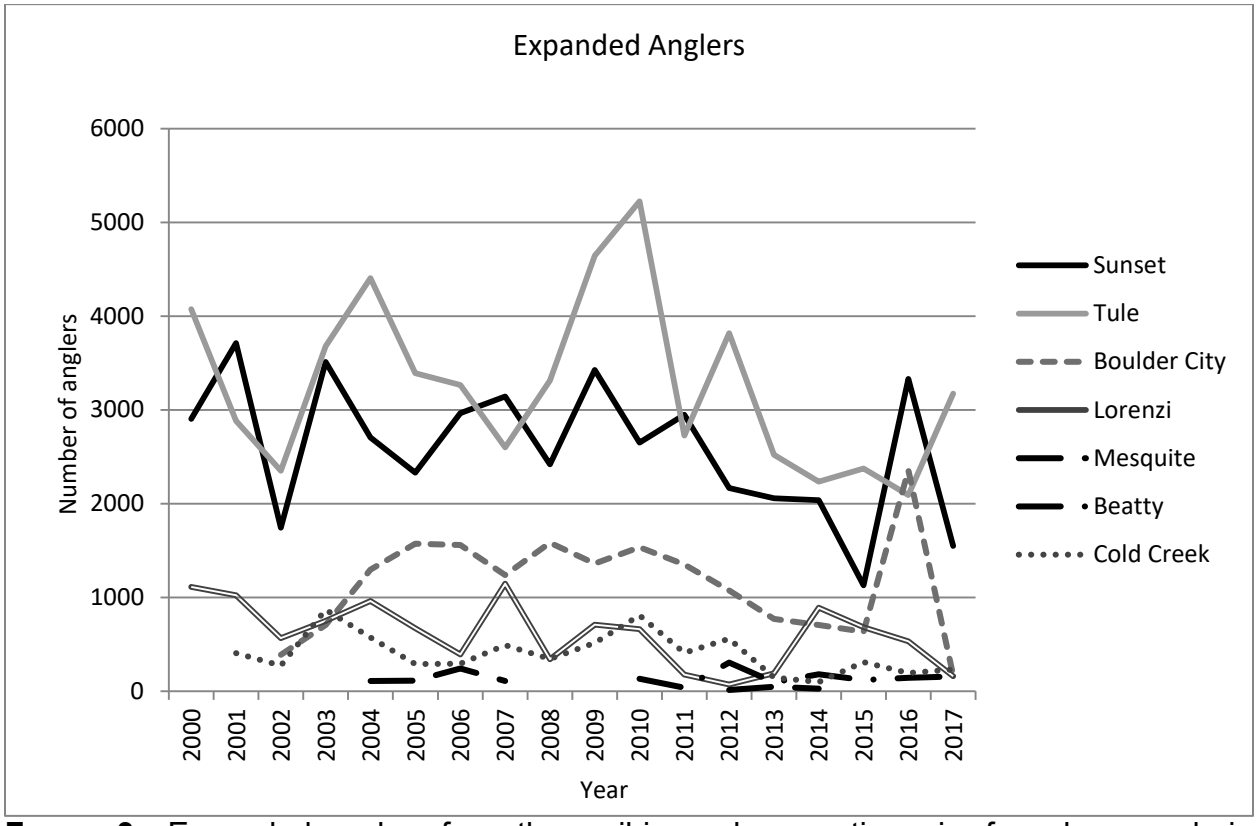

FIGURE 3. Expanded anglers from the mail-in angler questionnaire for urban ponds in southern Nevada, 2000 - 2017.

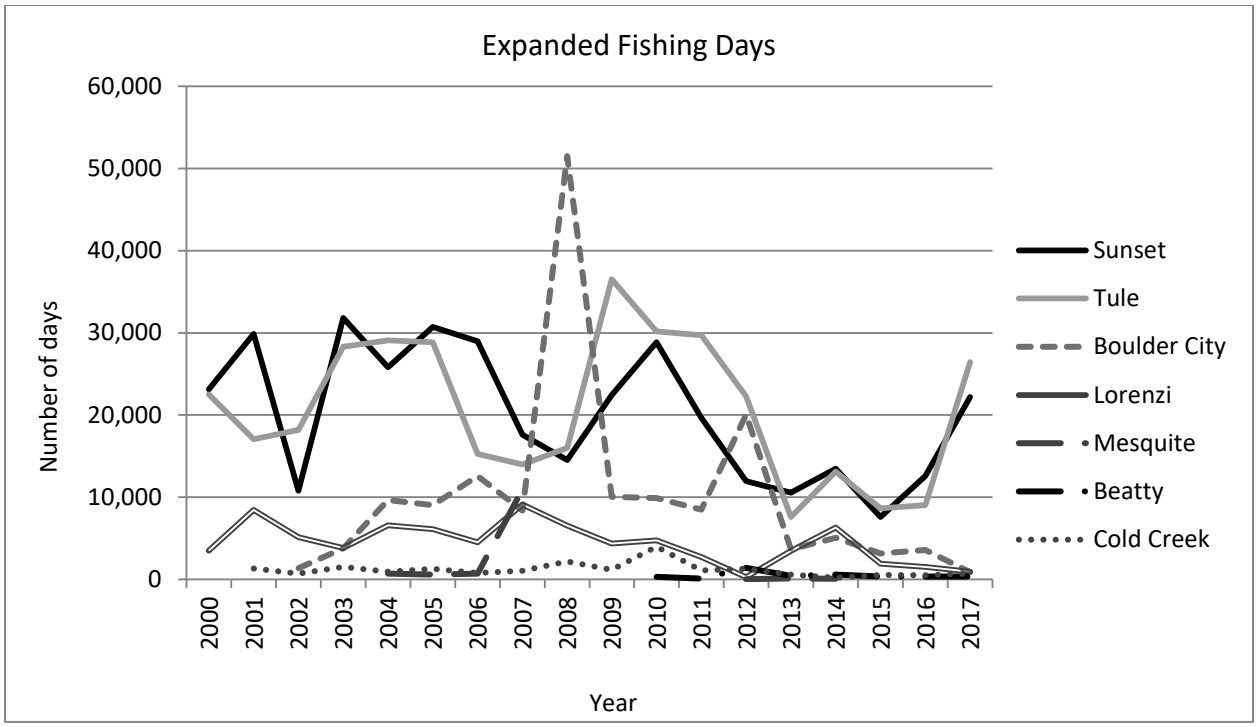

FIGURE 4. Expanded angler-fishing days from the mail-in angler questionnaire for urban ponds in southern Nevada, 2000 - 2017.

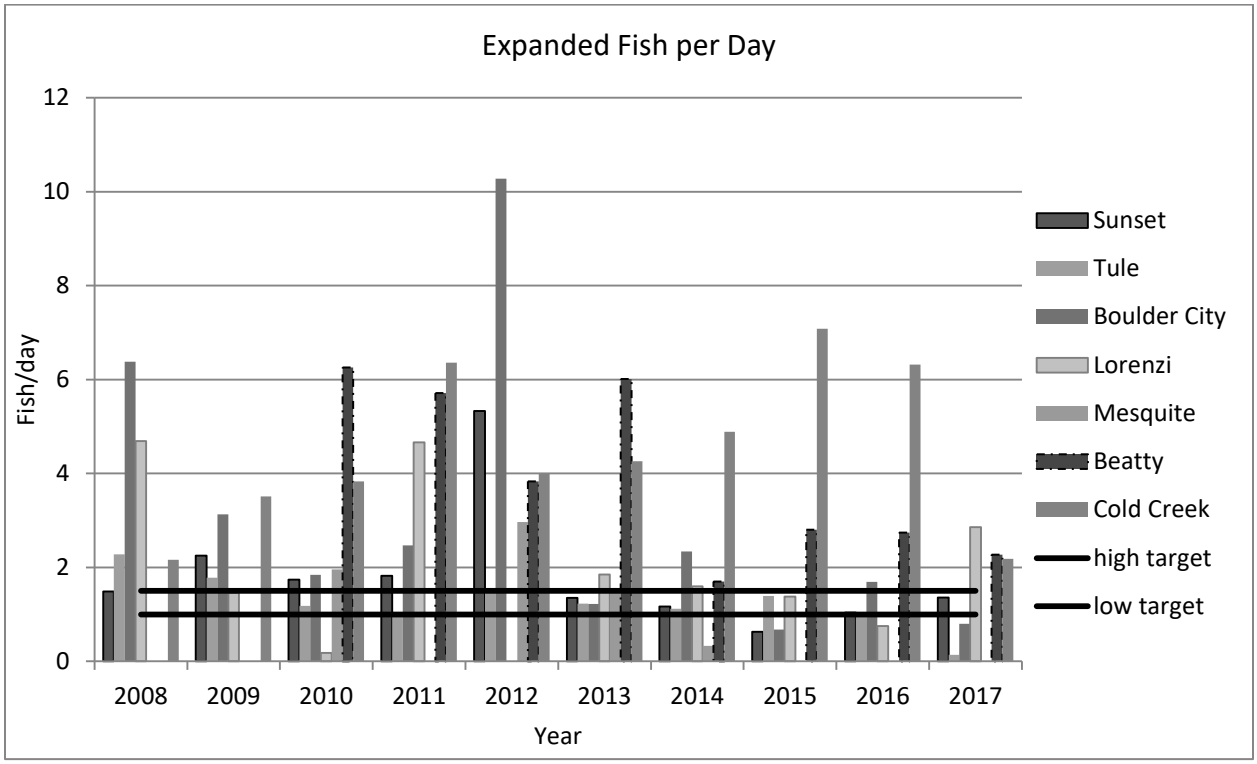

FIGURE 5. Expanded fish/day data from the mail-in angler questionnaire data for urban ponds in southern Nevada with high and low angler success targets according to NDOWs Urban Fishery Management Concept, 2008 - 2017.

Sunset Park Pond

Through 11 creel survey visits, 96 anglers were surveyed. Anglers caught 25 rainbow trout, 31 channel catfish, 1 carp, 2 bluegill, and 1 largemouth bass during 194 hours of fishing. Catch rates were 0.31 fish/hour and 0.63 fish/angler. Average fish per angler improved over the 0.38 fish/angler from last year (Figure 2), yet average fish per hour was nearly the same to last year (0.38 fish/hour) (Figure 1).

On all visits, water quality and quantity appeared suitable for stocking. On May 25, the water temperature was 25°C, conductivity was 1,904 µS/cm, and DO was 10.0 mg/L at over 100% saturation (Table 4). On October 1, reports came in about a large number of channel catfish mortalities and the pond was recently stocked on September 28. A visit was made to Sunset Pond on October 1 to check water quality, remove dead fish, and investigate the cause of mortality. Temperature, conductivity, and pH were satisfactory along with DO at 13.1 mg/L and saturated over 100% (Table 4). Seven dead channel catfish were observed and five could be reached for removal. The pond was visited again the next day and city maintenance staff had picked up 400 dead channel catfish. The high channel catfish mortality was attributed to secondary infections from stress (i.e., fish handling and hauling) and stocking of sick fish (although fish appeared healthy during stocking inspections). Brown's Fish Farm and Supply was notified of the high mortality and they replaced the lost fish on October 24.

TABLE 4. Sunset Park Pond water quality results.

Date	Time	Temperature (°C)	Conductivity µS/cm	DO (mg/L)	DO (% saturation)	pH
5/25/18	1335	25.28	1,904	10.0	123	7.28
10/1/18	1355	24.35	2,119	13.1	158	8.08

Lorenzi Pond

Lorenzi Pond was surveyed on nine visits and found 47 anglers that caught 40 fish in 88 hours. Fish consisted of 21 rainbow trout, 19 channel catfish, and 2 bluegill for catch rates of 0.45 fish/hour and 0.9 fish/angler. Catch rates in 2018 decreased from last year's catch rates of 1.2 fish/hour and 2.0 fish/angler, respectively. However, the average fish caught per hour in 2018 was within the targeted range (Figure 1) and the average fish caught per angler approached the 1.0 fish/angler objective.

On October 1, reports came in about a large number of channel catfish mortalities at Lorenzi Pond. A visit was made to the pond and temperature, conductivity, and pH were found to be satisfactory along with a DO of 10.0 mg/L at 100% saturation (Table 5). Thirty-eight dead channel catfish were removed from the pond and an angler provided information that approximately 150 lbs (68 kg) of fish were removed prior to our visit. As the day progressed, there were reports of mortalities at the other ponds in the valley. Since water quality was satisfactory and mortalities were observed at the other ponds, it did not appear that high mortality was pond-related and was likely due to secondary infections from stress (i.e., fish handling and hauling) and channel catfish were ill prior to stocking (although fish appeared healthy during stocking

inspections). Brown's Fish Farm and Supply was notified of the high mortality and they replaced the lost fish on October 24.

Eleven contact creel surveys were conducted at Tule Pond where 143 anglers were contacted. Anglers fished 295 hours, caught 50 rainbow trout and 44 channel catfish for a catch rates of 0.3 fish/hour and 0.7 fish/angler. Although present in the pond, no bluegill, largemouth bass, or carp were reported caught. Tule Pond had no change in catch rates observed from the previous year (Figures 1 and 2), but there was an substantial increase in the number of rainbow trout and channel catfish caught in 2018 compared to last year (9 rainbow trout and 20 channel catfish).

TABLE 5. Lorenzi Pond water quality profile, October 1, 2018, at 1145 hours.

	Depth (meters)		
	Surface	1 m	2 m
Temperature (°C)	24.9	24.9	24.8
Conductivity (µS/cm)	651	649	649
Dissolved oxygen (mg/L)	10.6	10.3	10.2
Dissolved oxygen (% saturation)	128	125	124
pH	8.05	7.99	8.00

Tule Pond (Floyd Lamb Park)

In late December 2017 and early January 2018, a cattail *Typha* sp. thinning project was contracted out by the City of Las Vegas. An amphibious machine with a hedge trimmer-type attachment was used to thin and cut pathways through the cattail stands and islands of vegetation. Some cattails around the shoreline were also cut by hand and there was cattail debris in the pond. On January 2, the water quality was checked to see if it was suitable for stocking. At the stocking site, the temperature was 8.8°C, conductivity was 400 µS/cm, pH was 7.36, and DO was 5.3 mg/L with 46% saturation (Table 6). In addition to the low DO levels, seven dead channel catfish were seen along the shore. Due to the low DO concentration, trout stocking was postponed. The pond water quality was checked again on January 8 and was found to have improved. The temperature was 9.6°C, the pH was 7.50, and the DO concentration was 10.6 mg/L with 93% saturation (Table 6). The cattail debris had been picked up and the pond was ready for stocking.

TABLE 6. Tule Pond water quality assessments taken at the water's surface near the stocking site.

Date	Time	Temperature (°C)	Conductivity (µS/cm)	DO (mg/L)	DO (% saturation)	pH
1/2/2018	1500	8.8	400	5.3	46	7.36
1/8/2018	1500	9.6	---	10.6	93	7.50
10/2/2018	---	23.3	388	12.7	145	7.91

During December 2017 through February 2018, dead channel catfish were observed around the perimeter of Tule Pond. The pond was visited on February 21 to

assess the water quality from a Jon boat in the middle of the pond. Temperature, DO, conductivity, and pH were taken in 1 m increments from the surface to a bottom depth of three meters. The pond temperature was between 9.6 and 10.2°C, conductivity was 384 µS/cm, dissolved oxygen was 11 mg/L with saturation between 99% and 102%, and pH was between 7.15 and 7.51 (Table 7). The profile showed there was adequate oxygen at depth and, therefore, the cause for the channel catfish mortality was unknown. Recommendations were made to reduce the number of channel catfish stocked to Tule Pond in October to reduce winter mortality. During November and December 2018, few channel catfish mortalities were seen at Tule Pond.

TABLE 7. Tule Pond water quality profile, February 21, 2018, at 1250 hours.

	Depth (meters)			
	Surface	1 m	2 m	3 m
Temperature (°C)	10.2	9.8	9.6	9.6
Conductivity (µS/cm)	384	384	384	382
Dissolved oxygen (mg/L)	11.1	11.4	11.6	11.6
Dissolved oxygen (% saturation)	99	101	102	102
pH	7.51	7.52	7.47	7.15

Urban pond channel catfish plants occurred in April through August 2018 and were successful. However, channel catfish stocked on September 24 resulted in high channel catfish mortality. On October 1, reports were made about a large number of mortalities at multiple Southern Region ponds. A visit was made to Tule Pond on October 2 to check water quality, count mortalities, and investigate reasons for such high mortality. There was 78 dead channel catfish observed at the pond, but the water quality was found to be satisfactory, with dissolved oxygen over 12.0 mg/L and saturation over 100%. Temperature, conductivity, and pH were also within satisfactory range (Table 6). Therefore, the cause of mortality did not seem to be pond-related and was attributed to secondary infections from stress (i.e., fish handling and hauling by the contractor) or the fish were sick prior to stocking (however, fish appeared healthy during stocking inspections). The numbers of dead channel catfish was reported to the vendor, which were replaces during the October 24 stocking.

Boulder City Pond

Nine visits were made to the Boulder City Pond to conduct creel surveys. Surveys contacted 42 anglers for 74.8 hrs of fishing and catching 42 rainbow trout, 12 channel catfish, and 3 bluegill. Catch rates were 0.8 fish/hr (Figure 1) and 1.4 fish/angler (Figure 2). Catch rates were much improved this year over last year (0.3 fish/hr and 0.3 fish/angler) with 32 more trout and 7 more channel catfish reported. Last year, an increase in angler use was observed from contact creel surveys and in 2017, an increase was observed in the Mail-in Angler Questionnaire Survey. Because of the increase in angler use, channel catfish numbers were adjusted for FY19. The September and October channel catfish plants for Boulder City Pond by increased by 200 lbs. Trout stocking numbers, however, were reduced by 6,524 fish (1,896 lbs) from

last year. This decrease did not appear to hurt angler catch rates, but rather anglers reported catching four times more trout than last year.

During creel survey and stocking visits to Boulder City Pond, water clarity and quantity was satisfactory for stocking. During May, August, and October, water quality was assessed with a YSI meter and found suitable for channel catfish. Water temperatures were between 24 and 29°C, DO was 8.0 mg/L with 100% saturation, and pH and conductivity were normal (Table 8).

TABLE 8. Boulder City Pond water quality assessments taken at the water's surface.

Date	Time	Temperature (°C)	Conductivity (µS/cm)	DO (mg/L)	DO (% saturation)	pH
5/25/18	1220	24.6	1,075	8.6	104	7.17
8/21/18	1100	29.2	1,101	8.0	106	8.03
10/1/18	1035	24.1	1,132	8.3	100	7.89
11/1/18	0840	15.7	1,057	12.0	120	7.80
11/14/18	1200	13.9	1,082	11.2	108	8.15

A visit was made to the Boulder City Pond on October 1 to investigate channel catfish mortalities from the September 28 channel catfish planting. Water quality was assessed with a YSI meter and was satisfactory with 8 mg/L DO with 100% saturation. Temperature, conductivity, and pH were also satisfactory (Table 8). A total of five dead channel catfish were observed, with reports from pond maintenance staff of an additional 75 mortalities they removed prior to our visit. With no water quality issues found, mortality was likely attributed to secondary infection from stress (i.e., fish handling and hauling) or the fish were diseased prior to stocking (although they looked healthy during stocking inspections). The channel catfish vendor was notified, replacing the loss with additional channel catfish on October 24.

On October 31, a week following the October 24 channel catfish plant, Boulder City Parks and Recreation Department notified NDOW of sick-looking fish at the Boulder City Pond. On November 1, a walk around the pond revealed two dead channel catfish and six live channel catfish covered with the fungus *Saprolegnia parasitica*. Live fish were in the shallows of the pond and lethargic. The water quality was found to be satisfactory (Table 8), though 5.0°C cooler (15.7°C) than on the stocking day (21.1°C). On November 7, the pond was rechecked and six dead channel catfish were netted. These may have been the fish seen on November 1 that later succumbed to the fungus. An additional six or more had been removed by park maintenance. The pond was rechecked again on November 14. The water quality was normal though cooler (Table 8), and another six dead channel catfish were removed. An angler reported picking up two dead channel catfish on a previous day. There were at least 22 channel catfish mortalities at the Boulder City Pond from the October 24 stocking event.

The exact cause of the fungal infection is unknown. Fungus is common in aquatic environments and is usually can be found growing on decaying organic matter. It is often a secondary infection growing from on fish that are injured, diseased, or living in poor conditions. Further, channel catfish can be susceptible to fungus during the winter when cold water suppresses their immune response (Winton 2001). No reports of diseased channel catfish came from other ponds that were stocked on October 24. The only difference in the stocking procedure at Boulder City Pond was the netting of fish from the transport tank instead of being directly piped out into the other ponds. Netting may have caused abrasions on the fish's skin, making it susceptible to a fungus infection. The rapid cooling of the pond may have played a role as well.

Mesquite Urban Pond (Hafen Pond)

No creel surveys were conducted at Mesquite Urban Pond. On stocking visits, water temperature, quantity, and clarity was assessed and found to be satisfactory for stocking. On July 23, a concerned angler reported that 50 channel catfish were gasping for air at the surface of the pond. The Mesquite Park maintenance staff was contacted and said there was a faulty capacitor in the aeration system and an electrician was called out to fix it. At 1950 hrs that evening, the water quality was checked and some channel catfish were observed just below the water surface, though not gasping for air. No dead fish were observed. Water quality from the bridge at 1950 hrs, just prior to dusk, was taken at 1.0 m intervals down to the bottom depth of 3.1 m. From the surface down to a 2.0 m, the water was quite warm at over 30°C, DO was sufficient at 8.0 mg/L with over 100% saturation. At 3 m near the bottom, however, DO dropped to less than 1.0 mg/L with 4% saturation, causing hypoxia and not able to support fish (Table 9).

TABLE 9. Mesquite Pond water quality profile taken from the bridge, July 23, 2018, at 1950 hrs.

	Depth (m)				
	Surface	1 m	2 m	3 m	3.1 m
Temperature (°C)	32.17	32.11	31.92	30.10	29.71
Conductivity (µS/cm)	3,367	3,371	3,369	3,393	3,420
Dissolved oxygen (mg/L)	9.8	8.8	8.0	0.3	0.1
Dissolved oxygen (% saturation)	135	121	110	4.2	1.2
pH	9.26	9.32	9.29	8.94	7.52

The water quality was checked 10 minutes later as the sun began to set. In this short time, DO dropped rapidly and the water was no longer supersaturated. Dissolved oxygen was 6.2 mg/L and saturation down to 1.0 m decreased to 85%. At 2.0 m down to the bottom, the water was anoxic and could not sustain fish (Table 10). Water quality was also checked near a pump outflow at 2020 hrs and had adequate oxygen with just over 6.0 mg/L dissolved oxygen (Table 11). This small area was likely used by the fish as an overnight refuge until DO levels increased during daylight hours due to photosynthesis.

TABLE 10. Mesquite Pond water quality profile taken from the bridge, July 23, 2018, at 2000 hrs.

	Depth (meters)			
	Surface	1 m	2 m	3 m
Temperature (°C)	32.01	31.78	30.19	29.94
Conductivity (µS/cm)	3,370	3,369	3,376	3,412
Dissolved oxygen (mg/L)	6.2	6.3	0.3	-0.4
Dissolved oxygen (% saturation)	86	86	4.5	-5.6
pH	9.22	9.28	9.04	7.74

TABLE 11. Mesquite Pond water quality assessment at pump outflow, July 23, 2018, at 2020 hrs.

	Depth
	Surface
Temperature (°C)	32.03
Conductivity (µS/cm)	3,371
Dissolved oxygen (mg/L)	6.7
Dissolved oxygen (% saturation)	93
pH	9.27

By July 25, the Mesquite Park maintenance staff reported they repaired one of the air pumps and the second pump may need to be replaced. On August 15, the pond was revisited and no fish were observed at the surface and pumps and bubblers on either side of the bridge were in operation. The water quality was checked at 1745 hrs and was satisfactory and ready for stocking channel catfish. The temperature was 31°C, conductivity was 3,500 µS/cm, pH was 8.72 to 9.30, and DO saturation was over 100% from the surface to the bottom with a range of concentrations from 9.0 to 15 mg/L (Table 12).

TABLE 12. Mesquite Pond water quality profile taken from the bridge, August 15, 2018, at 1745 hrs.

	Depth (meters)				
	Surface	1 m	2 m	3 m	3.1 m
Temperature (°C)	30.9	30.9	30.89	30.88	30.67
Conductivity (µS/cm)	3,550	3,553	3,552	3,553	3,282
Dissolved oxygen (mg/L)	14.3	14.7	14.8	15.0	9.5
Dissolved oxygen (% saturation)	193	199	200	203	120
pH	9.16	9.29	9.30	9.30	8.72

Water quality profiles were taken in 1.0 m intervals from the surface to the bottom when channel catfish were stocked in August and October. On August 22, a profile was measured at the bridge at 1430 hrs; the temperature was 29°C, conductivity ranged from 3,305 to 3,524 µS/cm, and DO saturation was over 100% except at the very bottom. The DO concentration was between 6.0 and 11.0 mg/L and pH was from 7.85 to 9.20 (Table 13). On October 24, the pond had started to cool and the temperature had dropped to 20°C. The DO concentration ranged between 11.0 to 22.0 mg/L and the water column was fully saturated. The conductivity and pH were normal for the

Mesquite Pond (Table 14). On both dates, the water quality was suitable for stocking channel catfish.

TABLE 13. Mesquite Pond water quality profile taken from the bridge, August 22, 2018, at 1430 hrs.

	Depth (meters)				
	Surface	1 m	2 m	3 m	3.1 m
Temperature (°C)	29.15	28.92	28.76	28.72	28.72
Conductivity (µS/cm)	3,524	3,524	3,522	3,519	3,305
Dissolved oxygen (mg/L)	11.4	10.8	9.8	8.2	6.8
Dissolved oxygen (% saturation)	150	141	127	107	88
pH	9.17	9.19	9.20	9.14	7.85

TABLE 14. Mesquite Pond water quality profile taken from the bridge, October 24, 2018, at 1500 hrs.

	Depth (meters)			
	Surface	1 m	2 m	2.5 m
Temperature (°C)	20.72	19.68	19.29	19.23
Conductivity (µS/cm)	3,475	3,464	3,456	3,455
Dissolved oxygen (mg/L)	22.0	13.2	12.5	11.0
Dissolved oxygen (% saturation)	251	145	137	121
pH	9.38	9.23	9.18	9.17

Cold Creek Pond

No creel surveys were conducted at the Cold Creek Pond. A visit was made on September 10 to verify the presence of nonnative goldfish *Carassius auratus* and fathead minnows *Pimephales promelas* prior to a rotenone treatment. Ten minnow traps were set in the larger pond and five were set into each of the two smaller ponds. Both goldfish and fathead minnow were found in all the ponds. The rotenone treatment was not completed in 2018 due to the lack of permitting from the Nevada Division of Environmental Protection.

Beatty Urban Pond

No creel surveys were conducted at the Beatty Pond.

MANAGEMENT REVIEW

The objectives of administering an urban fisheries program were met and approaches completed. Creel surveys found angler catch rates in terms of fish caught per hour were within the targeted range for an urban fishery as defined by an Urban Fisheries Management Concept. However, fish per angler catch rates need improvement at all ponds except Boulder City. Improving catch rates at Tule and Sunset Park ponds may be difficult due to the presence of largemouth bass as well as the high number of cormorants *Phalacrocorax auritus* observed feeding on stocked

trout. Largemouth bass are known to feed on rainbow trout and can contribute to reduced angler success. The 2018 stocking rates for channel catfish and rainbow trout appeared to be adequate for the magnitude of angler use and success. The reduction of channel catfish allocation stocked into Tule Pond last October seemed to have reduce the number of mortalities observed during the winter. Bluegill stocking also was successful this year. Five bluegill were reported captured during November creel surveys at Sunset and Boulder City ponds. Stocking of this species in 2019 should bolster their populations and increase angler success and opportunity.

RECOMMENDATIONS

Continue with the following approaches:

- Conduct a general fisheries assessment through direct angler contacts at least monthly at all managed sites except Mesquite (Hafen Park), Cold Creek, and Beatty ponds.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity).
- Evaluate annual stocking recommendations based on habitat conditions and angler use.
- Manage contracts for and coordinate stocking of purchased channel catfish for all pond during warm-weather months (April through October).
- Manage contracts for and coordinate stocking for purchased bluegill sunfish at select ponds during warm-weather months (April through October).
- Continue to stock bluegill sunfish to increase fishing success and opportunity.
- Identify and/or develop additional urban fishing waters in cooperation with local government entities as opportunities arise.

REFERENCES

NDOW [Nevada Department of Wildlife]. Program and procedure: Fishery management concepts, 7 pp.

Stenson, A. Nevada Department of Wildlife, Wildlife Area Technician (Creel clerk).

Winton, J. R. 2001. Fish health management. Pages 559-639 in G. A. Wedemeyer, editor. Fish Hatchery Management. Second Edition. American Fisheries Society, Bethesda, Maryland.

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