

NEVADA DIVISION OF WILDLIFE  
STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS

F-20-52  
2016

Kirch Wildlife Management Area  
SOUTHERN REGION



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

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JOB PROGRESS REPORT**

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## NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION ANNUAL PROGRESS REPORT

**State:** Nevada  
**Project Title:** Statewide Fisheries Program  
**Job Title:** Kirch Wildlife Management Area  
**Period Covered:** January 1, 2016 through December 31, 2016

### SUMMARY

Random creel surveys were conducted during 2016 in conjunction with other activities on the Kirch Wildlife Management Area (WMA). There were 47 anglers contacted throughout the Kirch WMA. The 2016 combined catch rate for all five reservoirs and all sport fish species was 6.3 fish/angler and 1.7 fish/angler-hour. Species harvested and observed in the creel or reported by anglers were rainbow trout *Oncorhynchus mykiss* and largemouth bass *Micropterus salmoides*.

Three volunteer angler creel drop-boxes were installed at Adams-McGill, Haymeadow, and Cold Springs reservoirs in 1996 and one at Dacey Reservoir in 2007. These boxes are used to collect voluntary information from anglers who were not contacted by a creel clerk. Drop-boxes collected 47 creel survey forms in 2016. Volunteer data showed 703 fish caught with 560 (80%) reported as released. The combined catch rate for the four reservoirs was 15 fish/angler and 3.2 fish/angler-hour and the reported harvest rate was 3.3 fish/angler and 0.6 fish/angler hour.

Spring electroshocking surveys were not conducted on the management area in 2016. The reservoirs were not sampled due to inclement weather and electroshocking boat availability.

Rainbow trout were stocked into Cold Springs, Haymeadow, and Adams-McGill reservoirs in the spring and fall. A total of 15,375 rainbow trout averaging 9.4 inches (in) total length (TL) were stocked into Adams-McGill Reservoir. A total of 26,520 rainbow trout averaging 9.1 in TL were stocked into Cold Springs Reservoir. Haymeadow Reservoir was stocked with 22,416 rainbow trout averaging 9.1 in TL. Dacey Reservoir did not receive fish in 2016 due to a fish kill at the hatchery.

Monitoring was conducted for quagga mussels *Dreissena bugensis* on all four reservoirs. Visual and tactile transects were negative for adult mussels. Plankton tows to sample for mussel larvae or "veligers" also came up negative. Efforts to coordinate reservoir water management were maintained with Kirch WMA personnel.

### BACKGROUND

Wayne E. Kirch Wildlife Management Area, located in the White River drainage of eastern Nye County, contains five reservoirs totaling 1,589 surface acres. Adams-McGill is the largest at 785 surface acres, Cold Springs at 275, Tule at 154,

Haymeadow at 190, and Dacey at 185 acres. Water sources for the Kirch WMA include the Flag Springs-Sunnyside Creek system, Hot Creek Spring system (both provide year-round water supply), and the White River drainage (which supplies water during spring and large rain events).

All reservoirs are shallow, with surface water temperatures ranging from freezing in the winter to the mid-70s (Fahrenheit) in the summer. The reservoirs have a naturally sustaining largemouth bass fishery and an artificially propagated rainbow trout fishery. Black bullhead *Ameiurus melas* and black crappie *Pomoxis nigromaculatus* are believed to have been introduced illegally.

## **OBJECTIVES and APPROACHES**

### **Kirch WMA General Sport Fisheries Management**

**Objectives:** Monitor angler use, catch rates, and changes in the fish population dynamics. Develop and analyze information on fishery conditions to develop annual coldwater stocking recommendations and identify future changes in management prescriptions.

#### Approaches:

- Manage black bass and stocked rainbow trout fisheries to meet management objectives as general or quality waters.
- Monitor fish populations and angler performance at levels necessary to validate management prescriptions and identify necessary management actions.
- Coordinate reservoir management to insure compatibility with fishery and waterfowl management objectives.
- Implement strategies to minimize impacts to the fisheries from avian predation and invasive aquatic species.
- Conduct a general fisheries assessment through opportunistic angler contacts at all four Kirch WMA reservoirs.
- Maintain volunteer angler drop-boxes at Dacey, Adams-McGill, Haymeadow, and Cold Springs Reservoirs.
- Coordinate water management and reservoir management needs with the Kirch WMA manager and update the fisheries management sections of the Kirch WMA Conceptual Management Plan (CMP) in cooperation with the Kirch WMA manager as required.
- Continue implementation of bird predation, control strategies through the management of unoccupied bird habitat and adjustments to trout stocking strategies.
- Provide sport fishery information to anglers directly and through NDOW channels.

- Implement strategies for early detection and long term monitoring for quagga mussels and other invasive species consistent with NDOW Southern Region and statewide aquatic invasive species plans.
- Implement strategies to prevent introduction and reduce spread of quagga mussels through signage, information delivery, and angler/boater contacts.

### Kirch WMA Black Bass Evaluation

**Objectives:** Describe the current structure and condition of the Kirch WMA largemouth bass fishery and examine if changes are needed in existing largemouth bass harvest regulations.

Approaches:

- Evaluate black bass catch and harvest data from volunteer angler drop-box responses at Dacey, Adams-McGill, Haymeadow, and Cold Springs reservoirs.
- Complete a spring electroshocking survey at Dacey and Adams-McGill Reservoirs to assess rainbow trout overwintering growth and survival, and other warm-water species population structure and recruitment.
- Complete a spring electroshocking or hoop/gillnet survey at Haymeadow and Cold Springs Reservoirs to assess rainbow trout overwintering growth and survival, and other warm-water species population structure and recruitment
- Evaluate existing and new data on the black bass population in the reservoirs and identify possible changes in black bass harvest regulations that would benefit the fishery.

### Dacey Reservoir Trophy Fishery Evaluation

**Objectives:** Evaluate angler preference regarding management strategy change, specifically towards developing a special harvest regulation at Dacey Reservoir. Additionally, examine the potential for Dacey Reservoir to support a Trophy or Quality Fishery Management Concept.

Approaches:

- Stock up to 5,000 rainbow trout annually at a minimum size of nine in TL during late fall.
- Conduct an electroshocking survey annually in the spring to evaluate age structure and species composition of the sport fishery.
- Collect basic water quality data semi-annually (April and October) to evaluate the potential effects of waterfowl and water management strategies.

- Collect angler success and satisfaction data through direct contact creel surveys at least twice a month from August to October and maintain a volunteer, angler drop-box.

## **PROCEDURES**

### Kirch WMA General Sport Fisheries Management

Opportunistic creel surveys were conducted monthly at Dacey, Cold Springs, Haymeadow, and Adam-McGill reservoirs. Angler drop-boxes were checked monthly at all four reservoirs. Data recorded consisted of fish species caught, number of fish kept and released, lengths and weight of fish, and angler origin. All data was entered and maintained in a database.

Electroshocking surveys were not conducted on any of the reservoirs in 2016 due to electroshocking boat and area biologist availability. Fifteen and a half hours (h) at Dacey Reservoir, 18 h at Adams-McGill Reservoir, 9.25 h at Cold Springs Reservoir, and 0 h at Haymeadow Reservoir were spent conducting hook-and-line surveys to compensate for the lack of electroshocking surveys.

Fixed substrate samplers were maintained and visual/tactile transects completed for adult quagga mussel detection in June and September at all four reservoirs. Plankton tows were conducted in July at all four reservoirs. Kirch WMA personnel visually monitored the reservoirs for avian predators.

### Kirch WMA Black Bass Evaluation

Opportunistic creel surveys were conducted monthly at Dacey, Cold Springs, Haymeadow, and Adam-McGill reservoirs. Angler drop-boxes were checked monthly at all four reservoirs. Data recorded consisted of fish species caught, number of fish kept and released, lengths and weight of fish, and angler origin. All data was entered and maintained in a database.

Electroshocking surveys were not conducted on any of the reservoirs in 2016 due to electroshocking boat and area biologist availability. Fifteen and a half hours (h) at Dacey Reservoir, 18 h at Adams-McGill Reservoir, 9.25 h at Cold Springs Reservoir, and 0 h at Haymeadow Reservoir were spent conducting hook-and-line surveys to compensate for the lack of electroshocking surveys.

### Dacey Reservoir Trophy Fishery Evaluation

Opportunistic creel surveys were conducted semi-monthly. Angler drop-boxes were checked monthly. Data recorded consisted of fish species caught, number of fish kept and released, lengths and weight of fish, and angler origin. All data was entered and maintained in a database.

Electroshocking surveys were not conducted on Dacey Reservoir in 2016 due to electroshocking boat and area biologist availability. Fifteen and a half hours were spent conducting hook-and-line surveys to compensate for the lack of electroshocking.

## FINDINGS

### Kirch WMA General Sport Fisheries Management

#### Adams-McGill Reservoir

Five anglers were contacted at Adams-McGill in 2016. The anglers expended 19 hours to catch 49 fish, all of which were largemouth bass. The average reported catch rate was 9.8 fish/angler. Table 1 summarizes contact creel data from 2010 to present.

TABLE 1. Adams-McGill Reservoir contact creel data summary, 2010-2016.

| Year | Catch rates             |          | Average TL (in) |       |    | Comments                 |
|------|-------------------------|----------|-----------------|-------|----|--------------------------|
|      | fish/ang.               | fish/hr. | RB              | LMB   | UK |                          |
| 2010 | 2.75                    | 2        | 15.0            | 11.0  |    |                          |
| 2011 | No Creel Data Available |          |                 |       |    |                          |
| 2012 | 6.2                     | 3.54     | 12.7            | 11.0  |    | Most anglers after trout |
| 2013 | 3                       | 0.75     | 13.6            | 13.5  |    |                          |
| 2014 | 1                       | 0.41     | 14.5            | 13    |    |                          |
| 2015 | 6.2                     | 1.3      |                 | 12.7  |    |                          |
| 2016 | 9.8                     | 2.6      |                 | 12.75 |    |                          |

RB = rainbow trout, LMB = largemouth bass, UK = unknown-species not noted

Volunteer angler drop-box creel data forms were completed by 13 anglers, who expended 74 h to catch 126 fish, of which 30 were rainbow trout and 96 were largemouth bass. The average reported catch rate was 9.7 fish/angler with a reported harvest of 4.9 fish/angler. In 2016, 27 rainbow trout were measured and recorded, of those 6 or 22% were below 12 in TL, 19 or 70% were between 12 and 16 in TL, and 2 or 7% were above 16 in TL. Fifty-seven largemouth bass were measured and recorded on Adams-McGill Reservoir. Of those, 17 or 29% were less than 12 in TL, 25 or 43% were between 12 and 14 in TL, and 15 or 26% were greater than 14 in TL. Harvest and catch rates calculated from the volunteer creel data is summarized in Table 2.

TABLE 2. Adams-McGill Reservoir volunteer, creel survey data, 2010-2016.

| Year | # Fish captured | % Fish released | % Fish harvested | fish/angler |         | fish/hour |         |
|------|-----------------|-----------------|------------------|-------------|---------|-----------|---------|
|      |                 |                 |                  | Catch       | Harvest | Catch     | Harvest |
| 2010 | 37              | 81              | 19               | 12.3        | 2.33    | 3.22      | 1.64    |
| 2011 | 95              | 44              | 1                | 7.9         | 1.0     | 1.54      | 0.11    |
| 2012 | 290             | 73              | 27               | 16          | 4.3     | 3.6       | 0.95    |
| 2013 | 372             | 69              | 31               | 9.8         | 3.0     | 2.1       | 0.65    |
| 2014 | 70              | 73              | 27               | 14          | 3.8     | 3.0       | 0.80    |
| 2015 | 42              | 38              | 62               | 10.5        | 6.5     | 1.7       | 1.1     |
| 2016 | 126             | 49              | 51               | 9.7         | 4.9     | 1.7       | 0.9     |

A total of 15,375 rainbow trout averaging 9.4 in TL were stocked into Adams-McGill reservoir in 2016. Table 3 summarizes the rainbow trout stocking since 2010.

### Cold Springs Reservoir

Opportunistic creel surveys were conducted during 2016 in conjunction with other activities on the Kirch WMA. Eighteen anglers were contacted at Cold Springs Reservoir in 2016. The anglers expended 74.5 hours to catch 130 fish, all of which were largemouth bass. The average reported catch rate was 7.2 fish/angler. Table 4 summarizes contact creel data from 2010 to present.

TABLE 3. Total numbers, pounds, and average total length of rainbow trout stocked into Adams-McGill Reservoir, 2010-2016.

| Year | Number of rainbow trout | Total weight (pounds) | Average total length (in) |
|------|-------------------------|-----------------------|---------------------------|
| 2010 | 8,120                   | 1,400                 | 7.6                       |
| 2011 | 8,160                   | 1,700                 | 8.0                       |
| 2012 | 12,160                  | 3,500                 | 9.0                       |
| 2013 | 19,605                  | 3,650                 | 8.0                       |
| 2014 | 18,137                  | 4,920                 | 8.9                       |
| 2015 | 7,400                   | 2,500                 | 9.5                       |
| 2016 | 15,375                  | 5,725                 | 9.4                       |

TABLE 4. Cold Springs Reservoir contact creel data summary, 2010-2016.

| Year | Days creel                   | # Anglers | Total hours | RB |              | LMB |              | fish/angler | fish/ hour |
|------|------------------------------|-----------|-------------|----|--------------|-----|--------------|-------------|------------|
|      |                              |           |             | #  | Avg. TL (in) | #   | Avg. TL (in) |             |            |
| 2010 | ND                           | 9         | 17          | 23 | 13.1         | 0   | -            | 2.7         | 1.41       |
| 2011 | No contacts made in 2011     |           |             |    |              |     |              |             |            |
| 2012 | No contacts made in 2012     |           |             |    |              |     |              |             |            |
| 2013 | ND                           | 4         | 14          | 4  | 14.7         | 2   | 13           | 1.5         | 0.43       |
| 2014 | ND                           | 9         | 26          | 2  | 11.5         | 19  | 12.8         | 2.6         | 0.90       |
| 2015 | No anglers contacted in 2015 |           |             |    |              |     |              |             |            |
| 2016 | ND                           | 18        | 74.5        | 0  |              | 130 | 12.3         | 7.2         | 1.7        |

RB = rainbow trout, LMB = largemouth bass, ND=no data

Volunteer creel data forms were completed by 11 anglers, who expended 44 hours to catch 159 fish of which 77 were rainbow trout and 82 were largemouth bass. The average reported catch was 14.5 fish/angler with a reported harvest of 4.5 fish/angler. In 2016, 57 rainbow trout were measured and recorded, of those 31 or 54% were below 12 in TL, 26 or 46% were between 12 and 16 in TL, and 0 or 0% were above 16 in TL. Eighty-two largemouth bass were measured and recorded on Cold Springs Reservoir, of those 62 or 76% were less than 12 in TL and 20 or 24% were greater than 12 in TL. Harvest and catch rates calculated from the volunteer creel data are summarized in Table 5.

Cold springs Reservoir was stocked with 26,520 rainbow trout averaging 9.1 in TL in 2016. Table 6 summarizes the rainbow trout stocking since 2010.

## Haymeadow Reservoir

Twenty-two anglers were contacted at Haymeadow Reservoir in 2016. The anglers expended 77 hours to catch 109 fish, of which 103 were largemouth bass and six were rainbow trout. The average reported catch rate was five fish/angler. Table 7 summarizes contact creel data from 2010 to present.

TABLE 5. Cold Springs Reservoir volunteer creel survey data summary 2010-2016.

| Year | # Fish caught | # Fish released | % Released | # Fish kept | % Fish kept | Fish /angler |         | Fish/ hour |         |
|------|---------------|-----------------|------------|-------------|-------------|--------------|---------|------------|---------|
|      |               |                 |            |             |             | Catch        | Harvest | Catch      | Harvest |
| 2010 | 220           | 80              | 36         | 140         | 64          | 12.2         | 7.8     | 2.3        | 1.47    |
| 2011 | 52            | 11              | 21         | 41          | 79          | 7.4          | 1.6     | 1.7        | 0.35    |
| 2012 | 155           | 110             | 71         | 45          | 29          | 9.1          | 2.6     | 1.9        | 0.56    |
| 2013 | 402           | 295             | 73         | 107         | 27          | 13.4         | 3.6     | 3.1        | 0.83    |
| 2014 | 213           | 155             | 72         | 58          | 27          | 8.9          | 2.4     | 1.7        | 0.48    |
| 2015 | 55            | 35              | 64         | 20          | 36          | 5.5          | 2.0     | 1.8        | 0.67    |
| 2016 | 159           | 110             | 69         | 49          | 31          | 14.5         | 4.5     | 3.6        | 1.1     |

TABLE 6. Total number, pounds, and average total length of rainbow trout stocked into Cold Springs Reservoir, 2010-2016.

| Year | # Rainbow trout | Total weight (pounds.) | Average total length (in) |
|------|-----------------|------------------------|---------------------------|
| 2010 | 38,480          | 9,362                  | 8.5                       |
| 2011 | 38,224          | 12,000                 | 9.2                       |
| 2012 | 38,416          | 10,825                 | 8.9                       |
| 2013 | 63,785          | 17,450                 | 8.8                       |
| 2014 | 35,455          | 9,970                  | 8.9                       |
| 2015 | 26,520          | 7,900                  | 9.0                       |
| 2016 | 26,520          | 7,800                  | 9.1                       |

Volunteer angler drop-box creel data forms were completed by nine anglers, who expended 47.5 hours to catch 169 fish of which 139 were rainbow trout and 30 were largemouth bass. The average reported angler catch rate was 18.8 fish/angler with a reported harvest of 1.9 fish/angler. In 2016, 140 rainbow trout were measured and recorded, of those, 125 or 89% were below 12 in TL, 13 or 9% were between 12 and 16 in TL, and 2 or 1% were above 16 in TL. Thirty largemouth bass were measured and recorded on Haymeadow Reservoir, of those 14 or 46% were less than 12 in TL, 15 or 50% were between 12 and 14 in TL, and one was greater than 14 in TL. Harvest and catch rates calculated from the volunteer creel data is summarized in Table 8.

TABLE 7. Haymeadow Reservoir contact creel survey data summary, 2010-2016.

| Year | Days surveyed | # Anglers | Angler hours | RB     |              | LMB    |              | fish/angler | fish/ hour |
|------|---------------|-----------|--------------|--------|--------------|--------|--------------|-------------|------------|
|      |               |           |              | # Fish | Mean TL (in) | # Fish | Mean TL (in) |             |            |
| 2010 | -             | 17        | 31.5         | 90     | 12.6         | 49     | 12.5         | 8.2         | 4.41       |
| 2011 | -             | 3         | 9.25         | 0      | -            | 10     | 12.6         | 3.3         | 1.1        |
| 2012 | -             | 2         | 2.75         | 12     | 12.9         | 0      | -            | 6           | 4.36       |
| 2013 | No Data       |           |              |        |              |        |              |             |            |
| 2014 | -             | 4         | 14           | -      | -            | 8      | 13           | 2           | 0.57       |
| 2015 | -             | 4         | 13           | 16     | 13.3         | 11     | 12.4         | 4           | 1.2        |
| 2016 | -             | 22        | 77           | 6      | 12           | 103    | 13.3         | 5           | 1.4        |

RB = rainbow trout, LMB = largemouth bass

TABLE 8. Haymeadow Reservoir volunteer creel survey data, 2010-2016.

| Year | # Fish caught | # Fish released | % Fish released | # Fish kept | % Fish kept | fish/angler |         | Fish/ hour |         |
|------|---------------|-----------------|-----------------|-------------|-------------|-------------|---------|------------|---------|
|      |               |                 |                 |             |             | Catch       | Harvest | Catch      | Harvest |
| 2010 | 216           | 147             | 68              | 69          | 32          | 10.8        | 3.5     | 2.4        | 0.78    |
| 2011 | 113           | 62              | 55              | 51          | 45          | 9.4         | 4.25    | 1.9        | 0.83    |
| 2012 | 416           | 302             | 73              | 114         | 27          | 11          | 3       | 2.7        | 0.75    |
| 2013 | 473           | 346             | 73              | 127         | 27          | 15.3        | 4.1     | 3.5        | 0.93    |
| 2014 | 474           | 411             | 86              | 63          | 13          | 17.6        | 2.3     | 3.7        | 0.49    |
| 2015 | 143           | 62              | 43              | 81          | 57          | 7.2         | 4.1     | 1.6        | 0.92    |
| 2016 | 169           | 152             | 90              | 17          | 10          | 18.8        | 1.9     | 3.6        | 0.36    |

A total of 22,416 rainbow trout averaging 9.1 in TL were stocked into Haymeadow Reservoir in 2016. Table 9 summarizes trout stocking since 2010.

TABLE 9. Total number, weight, and average total length of rainbow trout stocked into Haymeadow Reservoir, 2010-2016.

| Year | # Rainbow trout | Total weight (pounds) | Average total length (in) |
|------|-----------------|-----------------------|---------------------------|
| 2010 | 43,101          | 11,015                | 8.6                       |
| 2011 | 43,652          | 13,025                | 9.1                       |
| 2012 | 45,394          | 12,250                | 8.8                       |
| 2013 | 66,002          | 17,660                | 8.7                       |
| 2014 | 35,788          | 10,050                | 8.9                       |
| 2015 | 16,736          | 4800                  | 8.9                       |
| 2016 | 22,416          | 6630                  | 9.1                       |

## Kirch WMA Black Bass Evaluation

### Adams-McGill Reservoir

Electroshocking surveys were not conducted on Adams-McGill Reservoir in 2016 due to electroshocking boat and area biologist availability. Table 10 summarizes population sampling on Adams-McGill Reservoir from 2010 to present.

Data on largemouth bass from the creel and hook-and-line surveys was used to calculate relative weight ( $W_r$ ), an index of condition, and Proportional Stock Density

(PSD), an index of the percentage of fish of quality size (12 in TL or greater) in a population. When mean  $W_r$  values are well below 100, problems exist in food and feeding relationships. When mean  $W_r$  values are well above 100, fish may not be making the best use of available food. Largemouth bass sampled in Adams-McGill Reservoir had a mean  $W_r$  value of 90.5, which is higher than last year's index of 88.7 but still suggests that the fish are in good health and utilizing available forage. The PSD value for 2016 is 92, which is higher than last year of 89.

TABLE 10. Summary of population sampling data for Adams-McGill Reservoir, 2010-2016.

| Year  | # Fish    |     |    | Time (hours) | fish/hour | Avg. total length (in) |      |    | Max total length (in) |      |    |
|-------|-----------|-----|----|--------------|-----------|------------------------|------|----|-----------------------|------|----|
|       | RB        | LMB | UK |              |           | RB                     | LMB  | UK | RB                    | LMB  | UK |
| 2010  | 28        | 13  | -  | 0.9          | 44.6      | 14.4                   | 11.3 | -  | 18.1                  | 13.0 | -  |
| 2011  | 3         | 28  | -  | 1.2          | 28.4      | 9.7                    | 9.1  | -  | 12.0                  | 14.0 | -  |
| 2012  | No Survey |     |    |              |           |                        |      |    |                       |      |    |
| 2013* | 0         | 61  | -  | 18.5         | 3.3       | 0                      | 11.6 | -  | 0                     | 14.5 | -  |
| 2014* | 2         | 26  | -  | 8.5          | 3.3       | 13.5                   | 13.2 | -  | 14                    | 17   | -  |
| 2015* | 15        | 8   | -  | 6.5          | 3.5       | 13.4                   | 13.8 | -  | 17                    | 16   | -  |
| 2016* | 2         | 73  | -  | 14           | 5.4       | 14.8                   | 13.3 | -  | 16.5                  | 16   | -  |

RB = rainbow trout, LMB = largemouth bass, UK = unknown, species not noted  
 \*hook n line surveys

### Cold Springs Reservoir

Electroshocking surveys were not conducted on Cold Springs Reservoir in 2016 due to electroshocking boat and area biologist availability. Table 11 summarizes population sampling on Cold Springs Reservoir from 2010 to present.

Data on largemouth bass from the creel and population surveys was used to calculate  $W_r$  and PSD. Largemouth bass sampled in Cold Spring Reservoir had a mean  $W_r$  value of 96.2, which is higher than last year's 83.2 but still indicates excellent health. The PSD value for 2016 was 71, which is a large increase from last year's 31.

### Haymeadow Reservoir

Electroshocking surveys were not conducted on Haymeadow Reservoir in 2016 due to electroshocking boat and area biologist availability. Table 12 summarizes population sampling on Haymeadow Reservoir from 2010 to 2016.

Data on largemouth bass from the creel and population surveys was used to calculate  $W_r$  and PSD. Largemouth bass sampled in Haymeadow Reservoir had a mean  $W_r$  value of 89.6, which is higher than last year of 86.6 but still indicates excellent health. The PSD value for 2016 was 88, which is much higher than 75 recorded in 2015.

TABLE 11. Electroshocking survey data for Cold Springs Reservoir, 2010-2016.

| Year  | Number |    |    |    | Sampling (hours) | fish/hour | Average total length (in) |       |      |       | Max total length (in) |      |      |      |
|-------|--------|----|----|----|------------------|-----------|---------------------------|-------|------|-------|-----------------------|------|------|------|
|       | LMB    | RB | BB | BC |                  |           | LMB                       | RB    | BB   | BC    | LMB                   | RB   | BB   | BC   |
| 2010  | 5      | 17 | 2  | 5  | 0.6              | 48.3      | 13.9                      | 11.4  | 13.3 | 8.0   | 16.2                  | 15.5 | 13.5 | 8.2  |
| 2011  | 13     | 3  | 2  | 4  | 0.98             | 22.4      | 12.1                      | 12.0  | 12.5 | 9.0   | 19.0                  | 14.0 | 13.0 | 10.0 |
| 2012  | 20     | 19 | 2  | 1  | 0.62             | 68        | 10.3                      | 10.8  | 11.4 | 8.0   | 12.4                  | 14.5 | 12.0 | 8.0  |
|       | LMB    | RB | BB | BC |                  |           | LMB                       | RB    | BB   | BC    | LMB                   | RB   | BB   | BC   |
| 2013* | 30     | 0  | 8  | 4  | 0.47             | 89        | 10.8                      | -     | 12.4 | 7.1   | 13.5                  | -    | 14.0 | 7.5  |
| 2014* | 23     | 2  | -  | 8  | 16.5             | 2         | 11.1                      | 13.25 | -    | 10.25 | 13                    | 13.5 | -    | 12   |
| 2015* | 16     | 4  | -  | 2  | 5                | 4.4       | 10.9                      | 13    | -    | 12    | 13.5                  | 14   | -    | 12   |
| 2016* | 14     | 9  | -  | 7  | 9.25             | 3.2       | 11.8                      | 13.2  | -    | 12.1  | 14                    | 15   | -    | 12.5 |

LMB = largemouth bass, RB = rainbow trout, BB = black bullhead, BC=black crappie. \*Hook n' line surveys.

TABLE 12. Haymeadow Reservoir population sampling data summary, 2010-2016.

| Year  | #         |    |    |    | Sampling time (hours) | fish/hour | Avg. total length (in) |      |      |     | Max total length (in) |      |      |     |
|-------|-----------|----|----|----|-----------------------|-----------|------------------------|------|------|-----|-----------------------|------|------|-----|
|       | LMB       | RB | BB | BC |                       |           | LMB                    | RB   | BB   | BC  | LMB                   | RB   | BB   | BC  |
| 2010* | 7         | 34 | 9  | 0  | 1.83 net nights       | 27.3 F/NN | 10.9                   | 11.4 | 13.2 | -   | 15.1                  | 15.2 | 14.4 | -   |
| 2011  | No Survey |    |    |    |                       |           |                        |      |      |     |                       |      |      |     |
| 2012  | 42        | 10 | 5  | 2  | 0.6                   | 98        | 9.3                    | 12.8 | 12.0 | 6.0 | 21.5                  | 18.0 | 13.0 | 7.0 |
| 2013  | 19        | 2  | 2  | 1  | 0.73                  | 34        | 11.7                   | 12.0 | 11.3 | 8.5 | 19.0                  | 12.5 | 12.5 | 8.5 |
| 2015* | 17        | 3  | -  | -  | 6                     | 3.3       | 12.2                   | 11.6 | -    | -   | 13.5                  | 13   | -    | -   |
| 2016  | No Survey |    |    |    |                       |           |                        |      |      |     |                       |      |      |     |

LMB = largemouth bass, RB = rainbow trout, BB = black bullhead, BC=black crappie

\*2010 was a gill net survey. A net night =12 hrs. 2015 was a hook n line survey.

### Dacey Reservoir Trophy Fishery Evaluation

Opportunistic creel surveys were conducted in conjunction with other activities on the Kirch WMA. Two anglers were contacted, fishing for a total of five hours. These anglers caught seven rainbow trout. The average reported angler catch at Dacey Reservoir in 2016 was 1.4 fish/hour and 3.5 fish/angler. Table 13 summarizes contact creel data from 2010 to present.

TABLE 13. Dacey Reservoir creel survey data summary, 2010-2016.

| Year | Catch rates |           | Avg. total length (in) |      |    | Comments                 |
|------|-------------|-----------|------------------------|------|----|--------------------------|
|      | Fish/Angler | Fish/Hour | LMB                    | RB   | UK |                          |
| 2010 | 3           | 4.6       | 12.1                   | -    | -  | No trout in the creel    |
| 2011 | 2.4         | 1.5       | 13.0                   | 15.5 | -  | Only 4 bass in the creel |
| 2012 | 3.2         | 1.5       | 10.6                   | 17.3 | -  | Only 5 bass in the creel |
| 2013 | 8           | 1.5       | 13.1                   | 15.5 | -  | Only 2 anglers contacted |
| 2014 | 1           | 1         | 13.5                   | -    | -  | Only 2 anglers contacted |
| 2015 | 4.2         | 1.6       | 13.6                   | -    | -  | No bass in creel         |
| 2016 | 3.5         | 1.4       | -                      | -    | -  | No Bass in creel         |

LMB = largemouth bass, RB = rainbow trout, UK = unknown, species not noted

Volunteer angler drop-box creel data forms were completed by 14 anglers, who expended 57.5 hours to catch 242 fish of which 163 were rainbow trout and 79 were largemouth bass. The average reported angler catch rate was 17.3 fish/angler with a reported harvest of 0.79 fish/angler. In 2016, 163 rainbow trout were caught and measured, of those, 33 or 20% were below 12 in TL, 80 or 49% were between 12 and 16 in TL, and 51 or 31% were above 16 in TL. Eighty largemouth bass were caught and measured on Dacey Reservoir, of those, 67 or 84% were less than 12 in TL, 11 or 14% were between 12 and 14 in TL, and 2 or 3% were greater than 14 in TL. Harvest and catch rates calculated from the volunteer creel data is summarized in Table 14.

TABLE 14. Dacey Reservoir volunteer creel survey data 2012-2016.

| Year | # Fish caught | # Fish released | % Fish released | # Fish kept | % Fish kept | fish/angler |         | fish/hour |         |
|------|---------------|-----------------|-----------------|-------------|-------------|-------------|---------|-----------|---------|
|      |               |                 |                 |             |             | Catch       | Harvest | Catch     | Harvest |
| 2012 | 257           | 195             | 76              | 62          | 24          | 8.9         | 2.1     | 2.1       | 0.51    |
| 2013 | 127           | 103             | 81              | 24          | 19          | 7.1         | 1.3     | 1.3       | 0.25    |
| 2014 | 284           | 270             | 95              | 14          | 5           | 13          | 0.64    | 2.8       | 0.12    |
| 2015 | 91            | 85              | 93              | 6           | 6           | 10.1        | 0.67    | 2.8       | 0.18    |
| 2016 | 242           | 231             | 95              | 11          | 5           | 17.3        | 0.79    | 4.2       | 0.19    |

Electroshocking surveys were not conducted on Dacey Reservoir in 2016 due to electroshocking boat and area biologist availability. The trophy regulations governing rainbow trout are such that it is very difficult to creel for rainbow trout because most rainbow trout are released immediately after capture. Hook-and-line surveys targeting rainbow trout were used throughout the year to compensate for the lack of rainbow trout in the creel. Forty-four rainbow trout were caught in 15.5 hours for a catch rate of 2.8 fish/hour. Rainbow trout averaged 14.6 in TL, which is a bit small for a trophy fishery but up from last year's 13 in TL average. Trophy harvest regulations for Dacey Reservoir were developed in 2009 and put into effect in March 2010. Table 15 summarizes population sampling on Dacey Reservoir.

Data on largemouth bass from the creel and population surveys was used to calculate  $W_r$  and PSD. No largemouth bass were sampled in Dacey Reservoir in 2016 but 2014s' mean  $W_r$  value of 83.4 indicates excellent health.

TABLE 15. Electroshocking and hook-and-line survey data for Dacey Reservoir, 2010-2016.

| Year  | #  |     | Sampling hours | fish/hour | Avg. total length (in) |      | Max total length (in) |      |
|-------|----|-----|----------------|-----------|------------------------|------|-----------------------|------|
|       | RB | LMB |                |           | RB                     | LMB  | RB                    | LMB  |
| 2010  | 13 | 11  | 0.9            | 26.7      | 17.5                   | 12.0 | 19.0                  | 14.0 |
| 2011  | 12 | 38  | 1.5            | 33.3      | 14.0                   | 12.0 | 21.0                  | 15.4 |
| 2012  | 4  | 31  | 0.95           | 37        | 15.0                   | 11.2 | 18.0                  | 15.0 |
| 2013* | 29 | 13  | 28.25          | 1.5       | 17.7                   | 12.8 | 21.0                  | 15.0 |
| 2014* | 45 | 2   | 22.25          | 2.1       | 16                     | 12   | 20.5                  | 12   |
| 2015* | 19 | -   | 14.25          | 1.3       | 13.1                   | -    | 18                    | -    |
| 2016* | 44 | -   | 15.5           | 2.8       | 14.6                   | -    | 18                    | -    |

\*note: hook-and-line surveys

In 2016, no rainbow trout were stocked into Dacey Reservoir due to lack of available fish. Table 7 summarizes trout stocking on Dacey since 2004.

TABLE 16. Total number, weight, and average total length of rainbow trout stocked into Dacey Reservoir, 2010-2016.

| Year | # Rainbow trout   | Total weight (pounds) | Average total length (in.) |
|------|-------------------|-----------------------|----------------------------|
| 2010 | 5,320             | 1,400                 | 8.7                        |
| 2011 | 5,280             | 1,200                 | 8.3                        |
| 2012 | 5,100             | 1,500                 | 8.7                        |
| 2013 | 10,675            | 1,750                 | 7.3                        |
| 2014 | 10,200            | 2,550                 | 8.5                        |
| 2015 | 9,650             | 3,000                 | 9.3                        |
| 2016 | No Trout Stocking |                       |                            |

### MANAGEMENT REVIEW

The sport fishery at Kirch WMA seems to be doing well. Overall health of largemouth bass seems to be excellent and the overall size of largemouth bass being caught is up from last year. The PSD is in the 70s range for all the reservoirs. A regulation change for the management area was implemented in 2016 to increase that percentage. A concerted effort to contact more anglers to increase sample size in the creel will be done in 2017. Black crappie have been introduced illegally to the management area. It is not known when this occurred but they are showing up in population and creel surveys on Adam's-McGill, Cold Springs, and Haymeadow reservoirs. Black crappie appear to be increasing in numbers particularly in Cold Springs Reservoir and anglers are excited for this new opportunity. Surveys focusing on black crappie will be done in 2017 to assess population and size structure. The average size of rainbow trout stocked into all reservoirs was about the same in 2016 compared to 2015. A larger average size of fish is recommended for stocking in spring when fishing pressure is increasing. It is not as important for fall stocking since fish are able to grow throughout the winter. Dacey Reservoir is now being managed as a trophy fishery; therefore, average fish size being stocked is more desirable at nine inches TL or larger.

### RECOMMENDATIONS

- Conduct a general fisheries assessment through opportunistic angler contacts at all four Kirch WMA reservoirs.
- Maintain volunteer angler drop-boxes at Dacey, Adams-McGill, Haymeadow, and Cold Springs reservoirs.
- Coordinate water management and reservoir management needs with the Kirch WMA manager and update the fisheries management sections of the Kirch WMA CMP in cooperation with the Kirch WMA manager as required.

- Continue implementation of bird predation control through management of unoccupied habitat and adjustments to rainbow trout stocking strategies.
- Provide sport fishery information to anglers directly and through NDOW channels.
- Implement strategies for early detection and long-term monitoring for quagga mussels and other invasive species consistent with NDOW Southern Region and statewide aquatic invasive species plans.
- Implement strategies to prevent introduction and prevent spread of quagga mussels through signage, information delivery, and angler/boater contacts.
- Evaluate black bass catch and harvest data from volunteer angler drop-box responses at Dacey, Adams-McGill, Haymeadow, and Cold Springs reservoirs.
- Complete a spring electroshocking survey at Adams-McGill Reservoir to assess rainbow trout overwintering growth and survival and warm-water community structure and recruitment.
- Complete a spring electrofishing or hoop/gill net survey at Haymeadow and Cold Springs reservoirs to assess trout overwintering growth and survival, and warm-water community structure and recruitment.
- Continue to evaluate the new black bass harvest regulation for the management area.
- Continue to evaluate the trophy trout regulation for Dacey Reservoir.
- Identify current conditions in Dacey Reservoir using hook-and- line and electroshocking surveys.
- Stock up to 5,000 nine inch TL or longer rainbow trout in Dacey Reservoir in late fall every year.
- Conduct an electroshocking survey in Dacey Reservoir annually in the spring to evaluate age structure and species composition of the sport fishery.
- Collect angler success and satisfaction data at Dacey Reservoir through direct contact creel surveys semi-monthly and maintain a volunteer, angler drop-box to provide supplemental angler use information.

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