

JOB COMPLETION REPORT

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FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-5-R-9

Fisheries Investigations and Surveys of the Waters of Region 1-B

Job No. B-32 Fisheries Reconnaissance

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ABSTRACT

Reconnaissance work included using nets and seines to sample fish populations in 18 lakes and 3 stream areas. The fish obtained in 168 net sets and numerous seine hauls were examined to determine major changes in relative abundance of species and the size and utility of the various game fish produced. Vital factors such as reproduction and other requirements were studied, as were basic productive influences as water quality, aquatic vegetation and water level fluctuations. Aspects of the fish harvest were investigated to determine public ingress and egress, creel results, access roads and other conveniences, and the restrictions on means and methods of taking fish. Specific reconnaissance to evaluate previously completed development work was included for three major impoundments and several smaller bodies of water. Experiments in stocking were examined to determine initial success, and additional data on stream production were obtained to aid in formulating better fish harvest regulations. The work accomplished during the year is divided into five classifications that were determined by the basic purpose or objective of the field work. These were: (1) Primary or major impoundment studies where up to date records are necessary in affording priority to management work; (2) new or unexplored waters investigated as a result of requests for aid; (3) secondary reservoirs investigated for the same basic reasons as major impoundments, but that are too small or attract too few sportsmen from too limited an area to be included under the major impoundment classification; (4) evaluation of management where waters were re-examined to determine if successful renovation has been accomplished and if the expense required was justified; (5) acquisition of specific data to evaluate experimental management, for providing a better basis for formulating harvest recommendations, or where new techniques are evaluated.

JOB COMPLETION REPORT

State of Texas

Project No. F-5-R-9

Name: Fisheries Investigations and Surveys of
the Waters of Region 1-B. (Formerly 3-B)

Job No. B-32

Title: Fisheries Reconnaissance

Period Covered: March 1, 1961 - February 28, 1962

Objectives:

To conduct limited investigations to obtain current information concerning gross changes in fishing conditions and factors influencing fish populations.

Techniques Used:

Gill nets and seines were used to sample fish populations of 18 lakes and 3 streams during the year. Fish population samples were studied to determine major changes in the balance between desirable and undesirable species and for changes in the relative abundance, size and utility of the various game fish being produced. Changes in the condition of fish populations were noted and evidence of successful reproduction and other vital functions were recorded. Data regarding productive influences such as water quality, aquatic vegetation, and lake fluctuations were recorded. Aspects affecting harvest of the resource such as shoreline usage and access, fisherman success and the composition of creels were also noted where such information was readily available or could be obtained during the general investigation without extensive effort. Inquiries and investigations also included determining basic land usage for the watershed and possible sources of pollution.

A total of 167 netting collections and 11 seining collections was obtained. A netting collection is here defined as one gill net set overnight in a single location. A seining collection is considered to be the collective results of seining a small area such as a beach, inlet, hole, or bar regardless of the number of hauls involved. Netting and seining locations established in previous work were utilized as much as was possible for sampling in reconnaissance. Sometimes more than one netting trip was made to the same lake so that sampling could be conducted under different climatic or seasonal conditions or because the data produced by a previous effort was obviously insufficient. The topography of some lakes was such that seining was impossible, and seining efforts will be reported by discussion for that reason.

Organization and Limitations of Report

The data collected are here examined in order to note major changes in the balance between desirable and undesirable fish produced, and to ascertain changes in condition of important species. Data are also examined to determine if a

more detailed and elaborate resurvey will be required before conclusions can be reliably determined. Some of the data are obviously insufficient and sampling techniques are imperfect. For that reason no recommendation is made in several instances. The equipment used included nylon gill nets, measuring 125 feet in length, 8 feet in depth, and made up in 25 foot sections of varying size mesh. Beginning with a 1-inch square mesh section the nets increased by 1/2-inch intervals in succeeding sections to a 3-inch square mesh section. Several other nets were used for specific sampling. These had similar dimensions to experimental nets, except their construction included 1-, 1 1/2-, 2- and 3-inch mesh sections only. Various seines were used including a 12-foot common sense seine, and a 25- and 30-foot, one-fourth inch mesh seine.

The limited investigations conducted under reconnaissance were primarily motivated by a need for additional information and data to provide answers to some of the problems outlined and discussed in Fisheries Problem Determination reports, Job D-1, for projects F-5-R-7, F-5-R-8, and F-5-R-9. The work performed permits the materials here presented to be organized or classified in accordance with the basic reason or purpose for the field investigation. All waters reconnoitered under this job are reported under a classification system similar to that used by Bonn in reporting reconnaissance for project F-8-R-8, Job No. B-21. More detailed reporting of specific findings for the other jobs under this project are available in other completion reports, and the information used here is limited to providing a general and comprehensive picture of the basic conditions encountered. The five general classifications used are:

- Class I - Primary or Major Reservoirs Defined as lakes heavily utilized and of primary importance to large numbers of sportsmen that travel to the lake from a large geographical area.
- Class II - New or Unexplored Waters New reservoirs, small lakes and stream areas that have not been previously surveyed or evaluated.
- Class III- Secondary Reservoirs Small lakes that are of primary importance in a local area, but that do not commonly attract sportsmen from great distances. Also lakes that are too small to be afforded primary classification.
- Class IV - Evaluation of Management A re-examination of waters that have been renovated to determine if methods have been effective, and to ascertain if the benefits obtained justify the expense required.
- Class V - Acquisition of Specific Data Experimental management efforts are evaluated, data for formulating fish harvest regulations are obtained, and experimental techniques in sampling are examined.

Findings:

References are made, throughout this report, to a number of species of fish. The following checklist has been prepared to assure correct identification.

longnose gar-----	<u>Lepisosteus osseus</u>
gizzard shad-----	<u>Dorosoma cepedianum</u>
banded tetra-----	<u>Astyanax mexicanus</u>
smallmouth buffalo-----	<u>Ictiobus bubalus</u>
river carpsucker-----	<u>Carpionodes carpio</u>
gray redhorse-----	<u>Moxostoma congestum</u>
carp-----	<u>Cyprinus carpio</u>
golden shiner-----	<u>Notemigonus crysoleucas</u>
spottail shiner-----	<u>Notropis venustus</u>
redhorse shiner-----	<u>N. lutrensis</u>
roundnose shiner-----	<u>Dionda episcopa</u>
plains minnow-----	<u>Hybognathus placita</u>
channel catfish-----	<u>Ictalurus punctatus</u>
blue catfish-----	<u>I. furcatus</u>
black bullhead-----	<u>I. melas</u>
yellow bullhead-----	<u>I. natalis</u>
flathead catfish-----	<u>Pylodictus olivaris</u>
tidewater silverside-----	<u>Menidia beryllina</u>
white bass-----	<u>Roccus chrysops</u>
largemouth bass-----	<u>Micropterus salmoides</u>
green sunfish-----	<u>Lepomis cyanellus</u>
redear sunfish-----	<u>L. microlophus</u>
bluegill-----	<u>L. macrochirus</u>
yellowbelly sunfish-----	<u>L. auritus</u>
longear sunfish-----	<u>L. megalotis</u>
white crappie-----	<u>Pomoxis annularis</u>
freshwater drum-----	<u>Aplodinotus grunniens</u>
red drum (redfish)-----	<u>Sciaenops ocellata</u>
atlantic croaker-----	<u>Micropogon undulatus</u>
spotted squeateague (speckled trout)-----	<u>Cynoscion nebulosus</u>
Rio grande cichlid-----	<u>Cichlasoma cyanoguttatum</u>
mosquitofish-----	<u>Gambusia sp.</u>

Major Reservoirs of Primary Importance

As previously stated these waters are of primary importance because of utilization by sportsmen from extensive areas, and this utilization is regarded as being more important than the size of the reservoir. The purpose of reconnaissance here is to provide up-to-date information on the particular waters productivity in game fish, and to provide a basis for affording priority to management effort. The netting data obtained are included in tables 1 and 2. Pertinent seining data and observations are included in the following discussion.

Hoards Creek Reservoir was constructed and is operated by the U. S. Corps of Army Engineers. The first water impounded was in 1950. This municipal water supply is 8.7 miles west of Coleman, has 8,640 acre feet of water at conservation pool capacity, and at that elevation covers 510 acres. There are 11 miles of shoreline, and the Corps of Engineers maintain excellent access roads around the lake. Picnicking facilities and seven boat launching ramps are conducive to heavy utilization. During the year the lake commonly ranges between 5 and 10 feet below conservation pool elevation of 1900 feet. No pollution, vegetation or access problems were noted. The water of the lake is nearly always clear, and pH is usually near 8.

One of the primary changes in relative abundance of fishes as revealed by this investigation is that the lake no longer produces or sustains a sizable population of redear sunfish. The lake was formerly acclaimed for this asset. One netting collection indicated the average size of these fish to be 4 ounces, but on a second trip, when 82 of these fish were captured, the average size was only 1.9 ounces. Another population trend, that has been expected for some time, was the increase in gizzard shad and river carpsuckers. The capture of a single small flathead catfish may indicate reproduction by that species has occurred. The reservoir continues to produce excellent fishing for largemouth bass and channel catfish, and because of its location and conveniences is highly utilized. Seining included the capture of spottail shiners, mosquitofish, redear sunfish, bluegill, green sunfish and largemouth bass fingerlings.

Lake Colorado City is located five miles southwest of Colorado City in Mitchell County on Morgan Creek. At service spillway elevation this lake contains 31,800 acre feet and covers 2,030 acres. Security measures necessary to the national defense in protecting the hydro-electric power plant on the lake's shores continue to prevent public access to the lower one-half of the lake. This restriction is not without public benefit as pointed out in completion report for job B-27, Project F-5-R-7; since the restriction provides an area where catfish reproduction is high, and where other game species can reproduce without harassment. The lake shore area is heavily developed in private cabins, club houses and concessions, and the areas where public access is available are limited. In spite of these limitations the lake is heavily fished by sportsmen that travel from distances of over 200 miles.

Netting and seining collections reflect the tremendous production of game fish by this reservoir. Over 60 per cent of netting collections consisted of channel catfish, largemouth bass and desirable white crappie (avg. wt. 8.9 ounces). Another prime fishery that is not particularly apparent in examination of netting data is the flathead catfish population. These fish are much sought after and are often captured by local anglers. Although gizzard shad and river carpsuckers are established in this lake they do not yet appear to be as detrimental to game fish production as is apparent in other regional waters. Largemouth bass appear to be increasing through natural spawning success and because of other factors that are not clearly understood. This is unusual for the region and the apparent failure of white bass to increase after being introduced is not consistent with trends common to the region. The effect of phenomena unique to this lake will require further study. Seining captured gizzard shad, spottail shiners, redhorse shiners, largemouth bass, bluegill and white crappie.

Lake Nasworthy is the primary source of municipal water for San Angelo, Texas. This lake is 6.5 miles southwest of the city and impounds the middle and south Concho Rivers. At spillway capacity 1,300 acres are covered, and volume at that elevation is about 12,390 acre feet. Bulrushes (Scirpus), cattails (Typhus) and yellow water lillies (Numphar) continue to offer some obstructions to fishing and boating. However, as a result of chemical control measures described and reported in completion report for Job. No. 15a7, Project F-15-D-3, the shore areas are open to fishing, and in many instances the vegetation provides some protection from harassment by skiers. It is possible that the increase in largemouth bass may also be attributable to the clearing of shore areas. This work not only provided a greater spawning area and reduced harassment, but also permits circulation of the waters immediately adjacent to the shores and reduces excessive temperatures and stagnation. Public utilization

and interest in this lake remains intensive and the construction of facilities to permit and encourage recreation continues. Many sizable catches of largemouth bass and flathead catfish have been observed during reconnaissance, and there is little basis for doubting that the game fish produced and harvested is greater than has occurred for many years.

Only five gill net collections were made and these data do not indicate significant changes in relative abundance. The lake's fish populations appear to have reached a static balance, with gizzard shad and river carpsucker maintaining their dominance. The failure to capture white crappie is regarded as a sampling deficiency.

The potential development of a desirable fishery resource on the south and middle Concho watersheds and a subsequent renovation of Lake Nasworthy is discussed in the resurvey report for Project F-5-R-8. The dam that will create the reservoir above Lake Nasworthy is scheduled for completion in October of 1962. The addition of a hydro-electric power plant to the shores of Lake Nasworthy may be a means of improving and sustaining the game fishery resource.

Oak Creek Reservoir is three miles southeast of Blackwell, Texas, on the Nolan-Coke County line. At spillway level the reservoir contains 52,900 acre feet of water and covers 1,500 acres. Practically no run-off has entered the lake for over a year and the lake level was down nearly 13 feet when the collection was made in January of 1962. The current volume of 16,456 acre feet is the least quantity of water contained since the reservoir filled in 1953. Associated with this recession, extended periods of turbidity have occurred and food production was adversely affected. There has been a noticeable decline in the quantity of the game fish harvest and few desirable creels have been reported during the year.

Table 5 provides the results of 10 netting collections obtained. The dominance by river carpsuckers as indicated by the netting sample is considered near typical of collections obtained under the circumstances. However, the indicated increase in relative abundance of those fish (from 13.99 per cent in 1960 to 80.95 per cent in 1962) is considered highly significant. This increase supports the previous prediction that conditions of low water would result in an acceleration of the trend of undesirable fish toward complete dominance. There may also have been a corresponding increase in flathead catfish as was reported by responsible sportsmen. Further reconnaissance should be conducted at this lake to ascertain trends of populations, and if further recession occurs, to provide more extensive background data to decide what management effort is most likely to be fruitful. A study of the effect of the newly created power plant upon fish populations might also be justifiable.

San Angelo Reservoir is a primary flood control structure constructed and operated under the auspices of the U. S. Corps of Engineers. The dam is adjacent to the northwestern residential section of San Angelo, and at conservation pool the reservoir contains 119,188 acre feet of water. The water impounded is a secondary source for municipal water, and at conservation pool elevation approximately 5,456 acres are covered. For the third consecutive year the lake was receded by over 30,000 acre feet below conservation storage. As previously pointed out, the unobstructed expanse of open water is detrimental to fishing because of the frequency of occurrence of prevailing winds.

However, heavy public fishing continues. On week ends and holidays launching areas and other facilities are always crowded. White bass, largemouth bass, channel catfish and small white crappie sustain fishing.

Results of netting collections are in tables 6 and 7. Fish populations may have reached a near static condition, and the average size for most game fish taken is large. This has motivated a decision to hold the state plug fishing contest on this lake, and it is expected that the results from this fishing, by highly skilled anglers, will be high and should exceed results from some lakes previously selected. However, the apparent lack of natural reproduction by largemouth bass indicates that those fish are declining numerically. One interesting aspect of netting done near the entrance of the river was the capture of 46 freshwater drum. Although seven of these fish were netted in resurvey work for Project F-5-R-7, none were taken in previous sampling. These fish are normally difficult to capture in routine netting with the equipment normally used. It may be possible that San Angelo reservoir has sustained a higher population of drum than indicated; since these fish appear to concentrate in specific locations and their chance capture in samples might not have occurred. However, it is believed more probable that substantial quantities of these fish have entered the lake by migrating from the watershed above. Reconnaissance should be continued with the view that renovation of this reservoir should be accomplished when the other area waters are providing desirable game fish production in order that a rotation type management plan can be put into effect. Seining indicated reproduction by gizzard shad, carp, and white crappie. Spottail shiners and redhorse shiners were also captured by that method.

New or Unexplored Waters

The following data and discussion pertain to waters that had not been previously investigated. The motivation for including this work under reconnaissance is varied. In several instances the work was done at the request of municipal authorities while other work was in progress on nearby waters of primary or major importance. Other minor reservoirs were the only public fishing waters for a particular locality where past utilization indicated management would be justified. Investigations of unknown waters were also made when a basic rotation management plan was being considered for a particular area. In these situations the secondary reservoir would serve to provide limited fishing while renovation procedures were being employed to improve production in a primary or major reservoir.

Santa Fe Lake is privately owned by the Santa Fe Railroad, and is located 3 miles north of Sweetwater in Nolan County. The lake covers about 80 acres at spillway elevation and was near capacity at time of survey. This is an old lake constructed about 1926 and is greatly filled in by siltation. The lake is primarily fished by anglers for sunfish, and public fishing is limited. Shore fishing predominates methods used and access roads around the lake are needed. Vegetation is a primary problem as much of the shore is congested by pondweeds (Potamogeton), and muskgrass (Chara).

Netting results from this investigation are shown in table 8. Largemouth bass were not captured in this netting, but fingerling bass were secured in seining and larger fish are known to be occasionally taken by sportsmen. The average size for sunfish and crappie is interpreted as being indicative of

stunting through excessive numbers of those species, and channel catfish appear to be the most significant fishery resource.

There is little doubt that this lake is not fished intensively enough by a sufficient number of persons to justify spending any sizable amount of federal aid money. However, the lake has served as an alternate source for fishing while renovation of Lake Sweetwater was being effectuated, and can be expected to supply similar aid if Lake Trammel or Oak Creek Reservoir are included in future development work. Members of the board that control and regulate the lake have indicated that they may be interested in spending part of the revenue taken by sale of boating permits to control the aquatic vegetation or to improve the game fish production. It is recommended that management and further investigations of this lake be turned over to the state biologist for inclusion in that category of the regional work.

Secondary Reservoirs

The waters included under this category are usually of primary importance only in relatively small and localized areas. Some of the waters are simply too small to be afforded primary classification; although the yield in game fish on a per acre basis may exceed many primary waters. A few of the waters here designated as secondary reservoirs may be elevated to major classification in the future, when utilization and productivity warrant the change.

Novice Lake is a former water supply for that city and is located on Jim Ned Creek watershed about 30 miles west of Coleman in Coleman County. The lake has about 40 acres and volume is not known. The lake has afforded excellent fishing in the past and the reconnaissance work was completed at the request of local sportsmen who desired recommendations to restore fishing.

As shown in Table 9, gizzard shad and carpsuckers dominate the lake. Stunted crappie are excessive and bullheads further complicate and detract from game fish production. Renovation is recommended when federal aid requirements are met.

Old Winters Lake is a former water supply for the city of Winters in northern Runnels County on Elm Creek watershed. The lake has about 50 surface acres and impounds about 250 acre feet when at spillway level. In compliance with requests from the municipal authorities, reconnaissance work by seining was completed in the spring of 1961. The lake had receded at this time to less than 30 acre feet of water and was completely dominated by carp and gizzard shad. Following this investigation the lake was eradicated and subsequent restocking is expected to effectuate complete renovation.

New Winters Lake. Reconnaissance sampling of this 250 acre lake was completed during the spring of 1961. This reservoir was much receded from its spillway capacity of about 11,000 acre feet at the time, and turbidity was high as a result of suspended red colloidal materials. As shown in Table 10, gizzard shad and river carpsuckers dominated fish population. However, significant channel catfish and white crappie populations apparently afford some successful game fish production. The data obtained are entirely insufficient, and further reconnaissance will be necessary in the future.

New Anson Lake is located 9 miles north of Anson and is that city's primary water supply. The lake was maintained near spillway capacity during the year and at that elevation covers about 350 surface acres. Suspended colloidal materials provide turbidity and help to control submerged aquatic vegetation, but yellow water lillies (Numphar sp.) render fishing in the shallow shore areas difficult.

Netting data in Table 11 indicate that gizzard shad, river carpsuckers and black bullheads dominate rough fish species. Channel catfish and small white crappie constitute the bulk of game fish captured. Seining was unproductive due to the previously mentioned vegetation; however, many small sunfish and minnows were observed.

There are no shore access roads around this lake and only one launching area is accessible. A significant portion of the lake is surrounded by private property, and this area is fenced to prohibit access to fishermen. It is believed that if a road could be opened up over the dam the lake would be more accessible and would as a consequence accommodate more fishermen.

Old Anson Lake is a former water supply for Anson and is approximately 4 miles south of that city. It was estimated that the lake usually covered about 80 acres during the project period. Much of the shoreline is inaccessible to sportsmen, access being prohibited by bulrushes (Scirpus). The city purchased the chemical required for control of these plants and limited application has been initiated.

Results of netting collections are in Table 12 and Table 13. The only significant aspect of the limited data obtained is the abundance of golden shiners that were captured in the March netting. Since only 25 feet of each experimental gill net used was capable of capturing these fish, it is considered likely that a large population of these shiners is present. The second netting was made primarily to explore this problem and only six individuals were captured. Golden shiners and bluegills that were rather small appear to be the only undesirable species presently occurring in the lake in great numbers. Seining was again unproductive because of the limited area where sampling could be accomplished.

Lake Trammel is located 5 miles south of Sweetwater, and is one of three sources of municipal water. This lake is the control reservoir into which water is pumped from Oak Creek Reservoir. At spillway elevation the lake covers about 200 acres and contains 2,500 acre feet. Water in the lake is normally clear but the water usage practices result in extreme fluctuation. Boat launching facilities and access roads around the lake are very limited, and occasionally aquatic vegetation reduces the effectiveness of fishing for the lake shores. Many anglers that fish at Lake Trammel are "bream" fishermen, and it would be desirable if more shoreline access roads were available.

Table 14 indicates that fish populations in this lake are primarily game species. These data are in accord with initial survey findings and with data from resurvey completed under Projects F-5-R-6 and F-5-R-7. Although the average size of white crappie captured in collections was only 2.3 ounces, several of the individuals netted were of desirable size. Channel catfish were not captured in reconnaissance netting, but previous investigation has established that a sizeable and healthy population of these fish exist. Extreme changes in relative

abundance apparently have not occurred since 1960. Management work for this reservoir is not deemed of primary importance until after a satisfactory renovation of Oak Creek reservoir is possible. Restocking may not be needed as largemouth bass juveniles, green sunfish, redear sunfish, bluegills, orange-spotted sunfish, white crappie, and bullheads were captured in seining.

Lake Balmorhea is 4 miles southeast of Balmorhea in Reeves County. The reservoir is heavily utilized for fishing, and extensively developed for recreation. The 640 surface acre, 6,350-acre foot reservoir is owned and operated under the auspices of Reeves County Irrigation District No. 1, and has provided excellent fishing in the past. In addition to run-off from the watersheds that contribute to Madera and Toyah Creeks, the lake is sustained by the permanent flow from San Solomon, Giffin, Phantom, and Saragosa Springs. The combined flow from these springs exceeds 90 acre feet of water per day.

Tables 15 and 16 show the results from reconnaissance netting, and these data are the basis upon which a decision to eradicate existing fish life is sustained. The reservoir and Toyah Creek, as well as connecting canals, was treated between December 1, 1961, and January 28, 1962. For complete details pertaining to the lake and its renovation see completion report for Job 16a34, Project F-14-D-6. It is recommended that reconnaissance in the 1962-63 period include extensive procedures to evaluate the benefits obtained from this management.

Lake Balmorhea is placed under this category solely because it had not been previously surveyed, and will in all probability be re-classified to be included under the primary or major impoundment category within the existing segment.

Lake Scarborough is located 8 miles north of Coleman. This lake covers 111.3 acres and contains 1,638.2 acre feet of water when at spillway capacity. The lake was at this level during most of the segment. Since reconnaissance netting data indicated a large population of gizzard shad, and because it was also known that freshwater drum were abundant in the lake, it was decided that a selective kill technique should be employed to reduce the problematic species of fish. The rigid schedule of federal aid personnel prevented their including this job during the fall of 1961. The work was completed by the state biological crew and per diem and other travel expense was paid by the state without federal aid. It is estimated that approximately 90 per cent of the shad population was destroyed, and no drum were netted by the state crew after the treatment. The details of this job are reported on a separate report entitled: "Selective Kill of Undesirable Fish at Lake Scarborough". The evaluation of results of this work will be included in reconnaissance for the coming year.

Evaluation of Management

All of the waters discussed under this sub-heading have been renovated by eradicating existing fish and restocking with hatchery reared game fish. Usually these evaluations were completed at opportune times when field work for reconnaissance or survey work was being carried out on nearby waters or when it was necessary to decide when the lake should be reopened to fishing.

Champion Creek Reservoir is the sister lake to Lake Colorado City and was renovated in 1959. This reservoir is located approximately 8 miles southeast of Colorado City in Mitchell County. The lake is capable of impounding over 41,000 acre feet of water. However, at no time since the impoundment was completed in 1958 has water volume exceeded 13,000 acre feet. During the project period volume contained never exceeded 10,000 acre feet. Fishing success has been excellent and progeny from successful reproduction by largemouth bass and other game species were observed in abundance. Netting results from two trips made during the segment do not indicate significant changes in fish populations when compared with previous data. However, the dormant problem represented by the existence of golden shiners, black bullheads and green sunfish may increase at any time. Channel catfish captured appeared to be some of the fish released from hatcheries because of the uniformity of their size. There have been reports of successful reproduction by the 22 flathead catfish moved to this lake from Lake Colorado City; however this is not confirmed.

The access problem was acute for over a year because of the failure of the city of Colorado City and the Texas Electric Service Company to reach an agreement and ratify a contract that would satisfactorily designate liability. This problem is somewhat alleviated by recent ratification of such a contract; however, access roads are generally in poor condition and remain a problem. A large area of the lower portion of the lake is restricted and is patrolled by employees of the Texas Electric Service Company to exclude public access. The area involved is less than at Lake Colorado City. A sizeable increase in volume would greatly expand the reservoir beyond the old stream banks and is regarded as all that is presently needed to establish a productive fishery that could last for several years.

Mountain Creek Reservoir is 2 miles east of Robert Lee in Coke County, and is that city's municipal water supply. At spillway elevation the reservoir impounds 950 acre feet and covers 77 acres. A fish eradication for this lake and parts of the contributing watershed was completed in April 1961. Complete details of that work are reported in the completion report for Job 16a32, Project F-14-D-5.

Table 20 shows the results of five net collections in February of 1962, 10 months after the eradication treatment and subsequent restocking. A total kill was believed to have been achieved and the occurrence of green sunfish, golden shiners and bullheads is attributed to fish being washed down from the watershed above or to some other means of inadvertent reintroduction.

It is recommended that intensive reconnaissance be made during the spring of 1962 in order to provide a basis for recommending an opening date for resuming fishing. Seining also indicated the presence of redhorse shiners, mosquitofish and green sunfish.

Lake Sweetwater was chemically treated on August 27, 1960, as part of a watershed renovation program. At that time 4,256 acre feet of water was impounded and covered 366.19 acres. The lake has contained near this same volume with slight variations of the water level since that work was completed. At spillway capacity the lake contains 11,500 acre feet and covers approximately 640 acres. Lake Sweetwater is now a secondary source for municipal water and is located 9 miles south of that city. The details of the fish eradication and restocking are given in completion reports for Job No. 16a23, Project No. F-14-D-4 and Job No. 18a11, Project No. F-14-D-5.

Since renovation the water has remained extremely clear, and as a result, vegetation predominated by Algae and Chara have expanded in some areas. There are also a few scattered patches of smartweed (Polygonum) around the lake's shore resulting in an abundance of food for game fish being produced. Seining results indicate successful reproduction by largemouth bass, redhorse shiners and spottail shiners.

The results of 21 netting collections are given in Tables 21 and 22. It is evident that sunfish and crappie have been reintroduced. This is believed to have occurred through a misunderstanding of stocking instructions and possibly through sportsmen releasing some of these fish in a misguided desire to help improve the lake.

Lake Sweetwater was reopened to public fishing on February 15, 1962, 18 months following the date of treatment. Creel census conducted on that day indicated the average catch in fish was 1.3 fish per man-hour. This is more than 10 times as great as indicated in creels examined prior to renovation. Approximately 3,500 persons attended the opening. Many of the largemouth bass captured exceeded 2 pounds, and catfish were recorded as high as 3 pounds 11 ounces. It is believed that warmer weather will increase both fishing pressure and yield.

Acquisition of Specific Data Needed

This final category could be regarded as a catchall for reporting miscellaneous reconnaissance data. Included here are results of all minor sampling that was done with very specific and limited objectives in view. For instance, this year sampling at Imperial and Red Bluff Reservoirs was primarily to attempt recapture of marine fish experimentally introduced, and the reconnaissance data obtained in that work are biased as a result. If sampling had been primarily motivated by a desire for knowledge of relative abundance, then both of these reservoirs would have been included under major reservoir classification. The sampling of the lower Pecos River and the Colorado River near Robert Lee was done to provide information pertinent to the production of bait species so that aspects of the reproductive requirements for those fish might be revealed and better understood. These studies will be continued from time to time, and are expected to provide a better basis for formulating future harvest regulations by supplying a better idea of how many and what kind of fish can be harvested without detrimental effect on the basic resource. It is possible that over a period of years many aspects of the life histories of many species may be worked out in this manner, and the knowledge gained could provide a basis for improving management through a better use of the naturally produced forage. Such studies could also provide the means of diversifying and improving hatchery production, and might provide information that would benefit the overall program. Inquiries were also made to determine if stocking experiments using largemouth bass fry were successful.

Red Bluff Reservoir is located on the Texas-New Mexico line about 60 miles north of the city of Pecos in Reeves County. The dam impounds the Pecos River and was constructed primarily for irrigation. For that reason fluctuations are often as great as 30 feet within a 10-month period. Because of these fluctuations natural reproduction of largemouth bass rarely occurred. It was believed that by taking advantage of the growing room created by the annual increase in volume that normally occurs during the winter when withdrawals are minimized, a substantial improvement in largemouth bass production might be effectuated by stocking with large quantities of bass fry during the early spring. This

was done in the spring of 1960 and all evidence indicates at least temporary success. Reports of fair largemouth bass fishing in the fall of 1961 were believed to be reliable, and the 'yearling' size and uniformity of the fish captured indicated that the fish were from the same age group. Other results are in Table 24. The successful recapture of marine fish introduced is reported in detail in completion report for Job No. F-1, Project F-5-R-9.

Imperial Reservoir is a control reservoir for Red Bluff Power and Water District and is located in a bend of the Pecos River near Imperial in Reeves County. The reservoir continues to afford excellent white bass fishing and other results are as shown in Table 23. The reservoir is heavily utilized and access roads are being improved. The limited area of the lake, about 1,000 acres, often results in harassment and competition between fishermen and other recreationalists.

The Lower Pecos River was sampled by seining and netting near Imperial and by seining at the mouth of Howard Draw near Pandale. Netting in the Imperial area was an unsuccessful attempt to secure or recapture marine fish introduced in 1957. However, data obtained indicated that the stream was dominated by unusually large gizzard shad and other species of questionable utility. This may have been the results of selective sampling because dense submerged vegetation prevented gill nets from being placed on the stream bed.

The production of minnows near the mouth of Howard Draw was tremendous and seining indicated spawning by the principal species of that area may be almost entirely dependent upon stream flow. Inquiries pertaining to the success of stocking of largemouth bass fry near the mouth of the river indicated that a relatively stable population of those fish have been created. However, as pointed out in completion report for Job B-15, Project F-5-R-8, many centrarchid populations are damaged by periodic floods that reduce dissolved oxygen below critical requirements. The benefit achieved is at best temporary.

The Upper Colorado River near Robert Lee was seined to provide data on the various minnows present. Data obtained indicated that late fall or even winter spawning may occur and that spring production is usually higher when flow is sustained during the winter.

Recommendations:

It is recommended that this job be continued, and that future efforts include additional efforts to determine more specifically what is required to maintain stream productivity.

Prepared by Lawrence S. Campbell
Project Leader

Approved by Marion Toole
Coordinator

Date June 28, 1962

Leo D. Lewis
Regional Supervisor

Table 1 - Results of four nets set for reconnaissance of Hoard Creek Lake - June 9, 1961.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average Weight lbs.	ozs.	Per cent of weight	Average "K"
gizzard shad	86	29.48	32	4	6	11.97	11.97	1.66
river carpsucker	61	20.88	170	12	2	12.8	63.42	2.29
carp	2	.68	10	5	5	2.5	3.83	2.21
channel catfish	21	7.19	33	7	1	9.4	12.42	1.42
black bullheads	3	1.03		11		3.6	.25	2.05
flathead catfish	1	.34		9		9	.21	1.45
warmouth bass	2	.68		5		2.5	.12	2.66
largemouth bass	3	1.03	6	7	2	2.3	2.39	1.80
redear sunfish	82	28.08	10	1	1.9	3.74	3.74	2.90
bluegill sunfish	10	3.43	1	5	2.1	.48	.48	2.86
white crappie	21	7.18	3	2	2.4	1.17	1.17	1.80
Totals	292	100.00	269	4			100.00	

Table 2 - Results of eight nets set for reconnaissance of Hoard Creek Lake - November 14, 1961.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "X"
gizzard shad	130	48.50	54	7	6.7	17.55	1.60	
golden shiner	5	1.87		13	2.6	.26	2.08	
river carpsucker	44	16.42	137	8	3	44.34	2.18	
carp	7	2.61	42		6	13.54	2.55	
channel catfish	29	10.82	49		1	15.80	1.44	
yellow bullheads	1	.37		8	8	.16	1.29	
largemouth bass	4	1.49	16	11	4	5.38	1.45	
redear sunfish	15	5.60	3	12	4	1.21	3.49	
bluegill sunfish	8	2.99	2		4	.65	2.42	
white crappie	25	9.33	3	7	2.2	1.11	2.08	
Totals	268	100.00	310	2		100.00		

Composite of Two Samples

Rough fish species 61.96 per cent by number and 77.86 per cent by weight.

Desirable species 39.04 per cent by number and 22.14 per cent by weight.

Table 3 - Results of nine nets set for reconnaissance of Lake Colorado City - February 14, 1962.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
gizzard shad	28	13.39	5	9	3.2	1.76	1.62	
river carpsucker	39	18.66	46	9	1	14.71	2.21	
carp	5	2.39	1	10	5.3	.51	2.27	
channel catfish	41	19.62	92	4	2	29.20	1.47	
flathead catfish	2	.96	14	5	7	4.54	1.80	
white bass	1	.48	2	5	2	.73	3.02	
largemouth bass	45	21.53	129	10	2	41.12	2.56	
redeer sunfish	1	.48		1	1	.19	2.08	
bluegill sunfish	7	3.35		9	1.1	.17	2.61	
white crappie	40	19.14	22	5	8.9	7.07	2.62	
Totals	209	100.00	315	3		100.00		

Rough fish species 34.44 per cent by number and 16.98 per cent by weight.

Desirable species 65.56 per cent by number and 83.02 per cent by weight.

Table 4 - Results of five nets set for reconnaissance of Nasworthy Lake - January 1, 1962.

Species	Number	Per cent of number	Total weight lbs. ozs.	Average weight lbs.	Per cent of weight	Average "K"
longnose gar	1	1.98	2	2	1.80	.36
gizzard shad	8	15.68	11	1.3	.62	1.67
river carpsucker	29	56.86	73	2	66.19	2.58
carp	1	1.97	5	4	1.12	2.44
channel catfish	2	3.91	8	4	.45	1.04
flathead catfish	1	1.96	7	7	7.00	1.75
white bass	3	5.88	2	5	2.09	2.34
largemouth bass	5	9.80	22	9	20.40	2.90
freshwater drum	1	1.96	6	6	.33	1.69
Totals	51	100.00	137	12	100.00	

Rough fish species 78.44 per cent by number and 70.06 per cent by weight.

Desirable species 21.56 per cent by number and 29.94 per cent by weight.

Table 5 - Results of ten nets set for reconnaissance of Oak Creek Lake - January 16, 1962.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
gizzard shad	5	7.93	4	15	15.80	3.98	2.00	
river carpsucker	51	80.95	107	13	2	1.50	86.98	
carp	1	1.59	5	5		4.06	2.48	
largemouth bass	2	3.18	5	14	2	15	4.18	
green sunfish	1	1.58		1		1	.50	
bluegill sunfish	3	4.77		6		2	.30	
Totals	63	100.00	124	6			100.00	

Rough fish species 89.97 per cent by number and 94.43 per cent by weight.

Desirable species 10.03 per cent by number and 5.57 per cent by weight.

Table 6 - Results of five nets set for reconnaissance of San Angelo Reservoir - January 4, 1962.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
longnose gar	1	1.08	3		3		2.07	.45
gizzard shad	4	4.35	1	10		6.25	1.11	1.39
river carpsucker	74	80.43	124	14	1	11	85.87	2.14
grey redhorse suckers	2	2.18	4	4	2	2	2.92	2.47
channel catfish	3	3.26	2	6		12.66	1.63	1.46
white bass	3	3.26	2	10		14	1.80	3.16
largemouth bass	1	1.09	4	12	4		3.27	2.52
white crappie	4	4.35		31		7.75	1.33	1.90
Totals	92	100.00	145	7			100.00	

Table 7 - Results of five nets set for reconnaissance of San Angelo Reservoir - June 1, 1961.

Species	Number	Per cent of number	Total weight lbs.	Average weight lbs.	Average weight ozs.	Per cent of weight	Average "K"
longnose gar	45	12.60	144	3	2.2	31.61	.53
gizzard shad	140	39.22	66	8	7.6	14.89	1.38
river carpsucker	47	13.16	123	2	10.2	27.76	2.56
carp	9	2.52	28	7	12.6	6.36	1.50
channel catfish	19	5.32	40	2	1.8	8.99	1.56
white bass	27	7.57	27	1	.5	6.23	2.17
bluegill sunfish	6	1.68		7	1.1	.10	3.14
longear sunfish	1	.28		1	1	.01	2.70
white crappie	17	4.76	1	6	1.3	.31	3.10
freshwater drum	46	12.89	16	11	5.8	3.74	1.80
Totals	357	100.00	446	9		100.00	

Composite of Two Samples

Rough fish species 84.72 per cent by number and 88.17 per cent by weight.

Desirable species 15.28 per cent by number and 11.83 per cent by weight.

Table 8 - Results of two nets set for reconnaissance of Santa Fe Lake - July 26, 1961

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
channel catfish	4	3.17	3	8	14	20.74	1.44	
black bullheads	28	22.22	5	6	3.2	31.85	2.26	
redear sunfish	34	26.99	2	11	1.2	15.92	3.76	
bluegill sunfish	24	19.04	1	12	1.2	10.37	3.54	
white crappie	36	28.58	3	9	1.7	21.12	2.33	
Totals	126	100.00	16	14		100.00		

Rough fish species 22.22 per cent by number and 31.85 per cent by weight.

Desirable species 77.72 per cent by number and 68.15 per cent by weight.

Table 9 - Results of two nets set for reconnaissance of Novice Lake - June 22, 1961.

Species	Number	Per cent of number	Total weight lbs. ozs.	Average Weight lbs. ozs.	Per cent of weight	Average "K"
gizzard shad	51	47.56	9 9	3	17.74	1.40
river carpsucker	14	13.08	19	1 5.7	35.27	2.14
channel catfish	8	7.48	19 8	2 7	36.20	1.65
black bullheads	4	3.74	2 1	8.2	3.82	2.27
white crappie	30	28.04	3 12	2	6.97	2.09
Totals	107	100.00	53 14		100.00	

Rough fish species 47.49 per cent by number and 69.58 per cent by weight.

Desirable species 52.51 per cent by number and 30.42 per cent by weight.

Table 10 - Results of three nets set for reconnaissance of New Winters Lake - June 22, 1961

Species	Number	Per cent of number	Total weight lbs. ozs.	Average weight lbs. ozs.	Per cent of weight	Average "K"
gizzard shad	33	36.66	4 4	2.1	8.38	1.40
river carpsucker	26	28.89	32 15	4.2	64.98	2.37
channel catfish	19	21.11	9 12	8.2	19.24	1.43
flathead catfish	1	1.11	2 5	5	4.56	1.58
redear sunfish	1	1.11	1 1	1	.12	3.38
bluegill sunfish	2	2.23	2 2	1	.25	3.17
white crappie	8	8.89	1 4	2.5	2.47	2.00
Totals	90	100.00	50 11		100.00	

Rough fish species 65.45 per cent by number and 73.36 per cent by weight.

Desirable species 34.55 per cent by number and 26.64 per cent by weight.

Table 11 - Results of two nets set for reconnaissance of New Anson Lake, - July 15, 1961.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
gizzard shad	14	12.38	1	15	2.2	3.25	3.25	1.72
river carpsucker	11	9.74	20	8	1	13.8	34.46	2.32
channel catfish	30	26.55	25	4	13.4	42.43	42.43	1.40
black bullheads	14	12.39	3	5	3.7	5.57	5.57	2.54
largemouth bass	2	1.77		10	5	1.05	1.05	2.01
green sunfish	1	.88		2	2	.21	.21	2.77
bluegill sunfish	7	6.20	1	12	3	2.94	2.94	4.08
white crappie	34	30.09	6		2.9	10.09	10.09	2.56
Totals	113	100.00	59	8		100.00	100.00	

Rough fish species 34.51 per cent by number and 43.28 per cent by weight.

Desirable species 65.49 per cent by number and 56.72 per cent by weight.

Table 12 - Results of four nets set for the reconnaissance of Old Anson Lake - March 16, 1961.

Species	Number	Per cent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Per cent of weight	Average "K"
largemouth bass	4	1.57	11	4	2	13	19.54	2.40
redeer sunfish	6	2.36	1	7		3.83	2.51	3.07
bluegill sunfish	48	18.91	9	13		3.27	17.04	4.18
golden shiner	194	76.38	34	12		2.86	60.37	1.92
warmouth bass	2	.78		5		2.50	.54	3.36
Totals	254	100.00	57	9			100.00	

Table 13 - Results of two nets set for the reconnaissance of Old Anson Lake - July 13, 1961.

Species	Number	Per cent of number	Total weight lbs. ozs.	Average weight lbs. ozs.	Per cent of weight	Average "K"
golden shiner	6	8.33	1 1	2.8	2.43	1.78
carp	1	1.39	15	15	34.38	2.47
channel catfish	2	2.78	13 4	6 10	30.38	2.08
largemouth bass	3	4.16	3 6	1 2	7.73	2.12
bluegill sunfish	59	81.95	10 8	3	24.07	3.73
white crappie	1	1.39	7	7	1.01	2.22
Totals	72	100.00	43 10		100.00	

Composite of Two Samples

Rough fish species 42.35 per cent by number and 48.57 per cent by weight.

Desirable species 57.65 per cent by number and 51.43 per cent by weight.

Table 14 - Results of six nets set for reconnaissance of Lake Trammell - February 13, 1962.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
golden shiner	36	25.36	6	10		.3	15.47	2.05
black bullheads	8	5.63	3	7		6.5	8.03	2.52
largemouth bass	9	6.34	20	1	2	4	46.86	2.46
redeer sunfish	3	2.11		5		1.8	.73	3.63
bluegill sunfish	1	.71		2		2	.29	4.20
white crappie	85	59.86	12	4		2.3	28.62	2.80
Totals	142	100.00	42	13			100.00	

Rough fish species 30.99 per cent by number and 23.50 per cent by weight.

Desirable species 69.01 per cent by number and 76.50 per cent by weight.

Table 15 - Results of five nets set for the reconnaissance of Lake Balmorhea - June 13, 1961.

Species	Number	Per cent of number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
gizzard shad	184	34.32	91		9		18.69	1.10
river carpsucker	230	42.91	324	6	1	7	66.64	2.29
grey redhorse sucker	1	.19		10		10	.13	2.00
carp	40	7.46	24	4		9.7	4.98	2.08
channel catfish	13	2.43	23	3	1	1	4.77	1.62
white bass	18	3.36	16	7		14.6	3.37	2.23
largemouth bass	5	.93		15		3	.20	2.03
orangespotted sunfish	1	.19		2		2	.02	3.80
redeer sunfish	1	.19		1		1	.01	4.10
bluegill sunfish	27	5.03		4		4	.06	3.37
white crappie	16	2.99	5	8		5.5	1.13	2.83
Totals	536	100.00	486	12			100.00	

Table 16 - Results of 15 nets set for reconnaissance of Balmorhea Lake - October 18, 1961.

Species	Number	Per cent of number	Total weight lbs. ozs.	Average weight lbs. ozs.	Per cent of weight	Average "K"
gizzard shad	749	52.63	348 9	7.4	29.58	1.25
river carpsucker	464	32.61	638	1 6	54.49	2.18
grey redbreast sucker	3	.22				
carp	61	4.28	27 7	6	1.95	2.17
channel catfish	11	.78	20 11	24 .33	1.43	1.42
white bass	78	5.48	117	1 8	9.99	2.94
largemouth bass	4	.28	10 1	1 7	.48	2.43
bluegill sunfish	5	.35				
white crappie	48	3.37	24	8	2.07	2.86
Totals	1,423	100.00	1,185 12		100.00	

Composite of Two Samples

Rough fish species 87.31 per cent by number and 88.23 per cent by weight.

Desirable species 12.69 per cent by number and 11.77 per cent by weight.

Table 17 - Results of eight nets set for reconnaissance of Scarbrough Lake - October 13, 1961.

Species	Number	Per cent by number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Per cent of weight	Average "K"
gizzard shad	80	43.95	33			7	58.80	1.81
river carpsucker	1	.55						
golden shiner	1	.55						
carp	1	.55	2	4	2	4	2.40	2.69
channel catfish	4	2.22	4	7	1	2	7.80	1.51
flathead catfish	1	.55	5	4	5	4	9.18	1.67
largemouth bass	1	.55						
warmouth bass	1	.55						
redear sunfish	4	2.20						
bluegill sunfish	13	7.15						
white crappie	74	40.65	10	12		2.2	19.20	.54
freshwater drum	1	.55	1	8	1	8	2.62	1.90
Totals	182	100.00	57	6			100.00	

Rough fish species 46.15 per cent by number and 63.82 per cent by weight.

Desirable species 53.85 per cent by number and 36.18 per cent by weight.
Fish not compiled were carried to hatchery for experimental purposes.

Table 18 - Results of 10 nets for reconnaissance of Champion Creek Lake - July 21, 1961.

Species	Number	Per cent by number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Per cent of weight	Average "K"
golden shiner	3	7.89		6		2	1.78	1.95
channel catfish	2	5.26	2	2	1	1	10.12	1.61
black bullheads	12	31.58	11	12		15.7	55.95	
largemouth bass	7	18.42	3	15		9	18.75	2.19
green sunfish	14	36.85	2	13		3.2	13.40	3.31
Totals	38	100.00	21				100.00	

Table 19 - Results of six nets set for reconnaissance of Champion Creek Lake - May 19, 1961.

Species	Number	Per cent by number	Total weight lbs. ozs.	Average weight lbs. ozs.	Per cent of weight	Average "K"
channel catfish	3	4.91	5 14	1 15.13	15.13	1.99
black bullheads	25	40.99	20 8	13.1	52.82	2.61
largemouth bass	6	9.83	4 5	11.5	11.11	2.20
green sunfish	27	44.27	8 2	4.8	20.94	3.35
Totals	61	100.00	38 13		100.00	

Composite of Two Samples

Rough fish species 40.23 per cent by number and 55.27 per cent by weight.

Desirable species 59.77 per cent by number and 44.73 per cent by weight.

Table 20 = Results of five nets set for reconnaissance of Mountain Creek Reservoir - February 20, 1962.

Species	Number	Per cent by number	Total weight lbs. ozs.	Average weight lbs. ozs.	Per cent of weight	Average "K"
golden shiner	2	12.50	6	3	3.42	1.90
channel catfish	4	25.00	9	2	84.58	1.89
largemouth bass	2	12.50	6	3.3	3.42	1.70
green sunfish	8	50.00	15	1.9	8.58	2.91
Totals	16	100.00	10	15	100.00	

Rough fish species 61.70 per cent by number and 26.59 per cent by weight.

Desirable species 38.30 per cent by number and 73.41 per cent by weight.

Table 21 - Results of 10 nets set for reconnaissance of Sweetwater Lake - July 20, 1961.

Species	Number	Per cent by number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
channel catfish	6	7.68	2	6	6.3	7.27	1.56	
largemouth bass	43	55.14	25	8	9.5	78.17	2.22	
green sunfish	2	2.56		4	2	.76	2.93	
bluegill sunfish	27	34.62	4	8	2.8	13.80	4.19	
Totals	78	100.00	32	10		100.00		

Table 22 - Results of 11 nets set for reconnaissance of Sweetwater Lake - December 20, 1961.

Species	Number	Per cent by number	Total weight lbs. ozs.	Average weight lbs. ozs.	Per cent of weight	Average "K"
channel catfish	4	3.33	9 8	2 8	30.21	1.96
black bullheads	12	10.00	5 8	6.7	17.50	2.55
largemouth bass	62	51.67	10 15	2.9	34.79	2.73
green sunfish	2	1.66	6	3	1.19	2.84
bluegill sunfish	22	18.34	3 5	2.4	10.54	2.48
white crappie	18	15.00	1 13	1.6	5.77	2.01
Totals	120	100.00	31 7		100.00	

Composite of Two Samples

Rough fish species 10.00 per cent by number and 17.50 per cent by weight.

Desirable species 90.00 per cent by number and 82.50 per cent by weight.

Table 23 - Results of 10 nets set for reconnaissance of Imperial Lake during March 8, 9, 10, 1961.

Species	Number	Per cent by number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
longnose gar	10	1.93	19	2	1	14.6	5.15	.43
gizzard shad	255	49.41	31	14		2	8.60	1.76
river carpsucker	51	9.89	29			9.1	7.82	2.07
carp	17	3.29	59	6.3	3	7.9	16.03	2.16
white bass	180	34.88	225		1	4	60.69	2.47
largemouth bass	1	.20	5	15	5	15	1.60	3.38
bluegill sunfish	2	.40		7		3.5	.11	3.80
Totals	516	100.00	374	5			100.00	

Rough fish species 64.52 per cent by number and 37.59 per cent by weight.

Desirable species 35.48 per cent by number and 62.41 per cent by weight.

Table 24 - Results of nine nets set for reconnaissance of Red Bluff - November 7, 1961.

Species	Number	Per cent by number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
gizzard shad	28	33.33	12	.25	.7	21.89	1.50	
smallmouth buffalo	8	9.52	10	15	1	17.65	2.18	
river carpsucker	9	10.72	7	12	14	12.58	1.82	
carp	7	8.33	2	.9	.6	.44	1.69	
white bass	28	33.33	23		.13	37.63	2.56	
bluegill sunfish	1	1.19		1	1	.10	3.01	
red fish	3	3.58	6		2	9.71	3.17	
Totals	84	100.00	61	15		100.00		

Rough fish species 61.90 per cent by number and 52.56 per cent by weight.

Desirable species 38.10 per cent by number and 47.44 per cent by weight.

Table 25 - Results of eight nets set for reconnaissance of Pecos River at Imperial - March 9, 1961.

Species	Number	Per cent by number	Total weight lbs.	ozs.	Average weight lbs.	ozs.	Per cent of weight	Average "K"
spotted gar	1	2.56	5	14	5	14	12.30	.55
gizzard shad	37	94.88	40	14	1	1.67	85.60	2.07
river carpsucker	1	2.56	1		1		2.10	1.49
Totals	39	100.00	47	12			100.00	

