THE LIFE STAGES OF TROUT:

TROUT SPECIES FOUND IN NEW MEXICO

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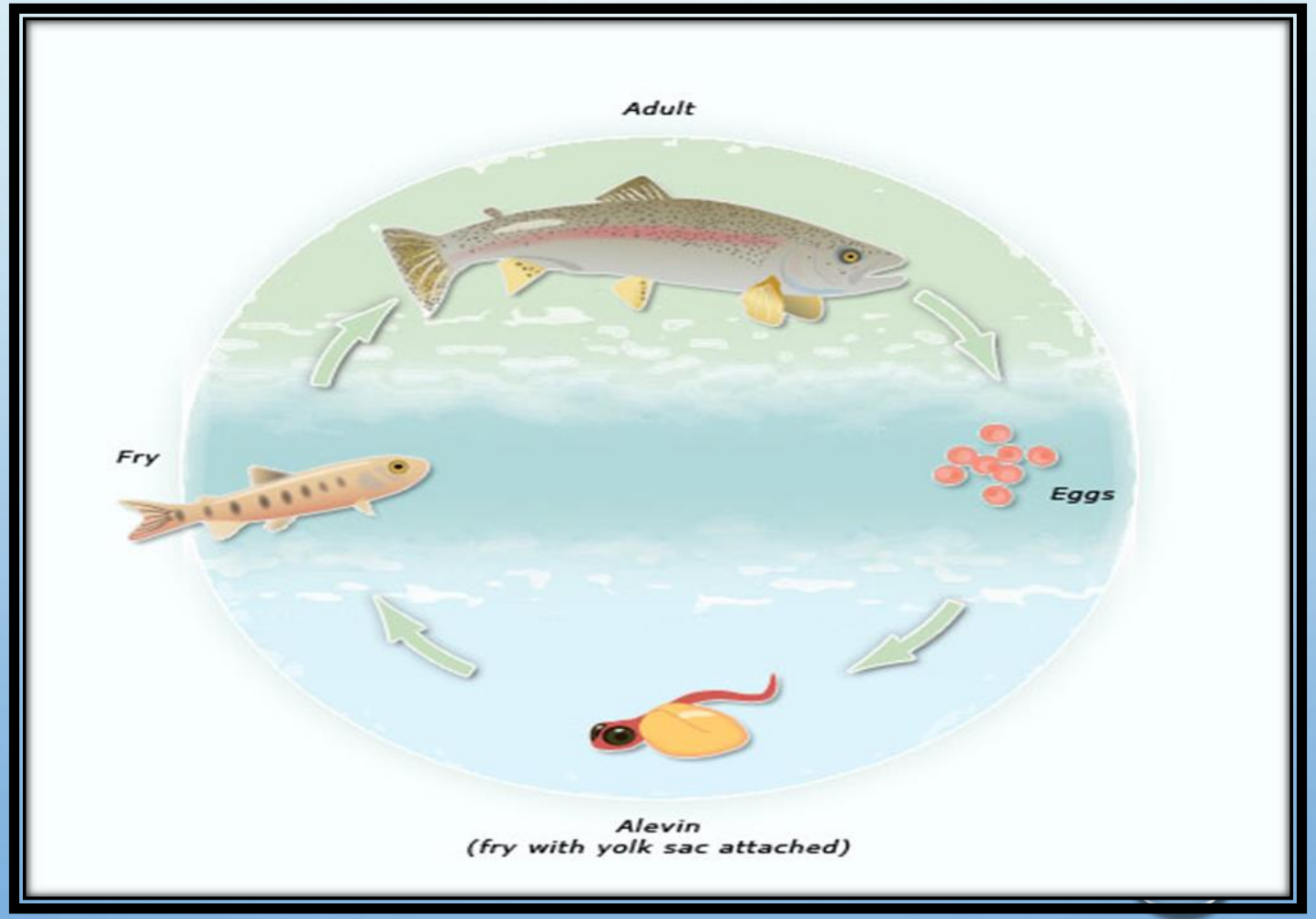
INTERESTING FACTS ABOUT TROUT

- AN ADULT TROUT CAN ACCELERATE FROM "HOLDING STILL" TO AN ESTIMATED 23 MILES PER HOUR AND TRAVEL 33 FEET IN ONE SECOND. NO OTHER MEMBER OF THE ANIMAL KINGDOM CAN ACCELERATE THAT FAST.
- TROUT FLOURISH IN COLD, CLEAN, FAST-FLOWING OXYGENATED WATER.
- A TROUT CAN JUMP OUT OF THE WATER 3 TO 4 TIMES ITS BODY LENGTH. THAT IS EQUIVALENT TO A HUMAN JUMPING 18 TO 24 FEET IN THE AIR OUT OF THE WATER.
- A TROUT'S SENSES OF SMELL AND TASTE ARE 500–800 TIMES BETTER THAN THAT OF A HUMAN.
- TROUT HAVE VERY GOOD EYESIGHT AND CAN SEE COLORS, MOVEMENT AND SHADOWS.
- AT 100 YARDS, THE LENGTH OF A FOOTBALL FIELD, A TROUT CAN HEAR AND "FEEL" BAIT BEING CAST INTO THE WATER USING ITS HEARING AND LATERAL LINES COMBINED.
- ON AVERAGE, A FEMALE TROUT CAN LAY BETWEEN 400–3,000 EGGS OR MORE, DEPENDING ON HER SIZE.

LIFE STAGES OF THE TROUT

THERE ARE FIVE LIFE STAGES IN A TROUT'S LIFE: THE **EGG** STAGE, **HATCHING** STAGE, **LARVAL** STAGE, **JUVENILE** STAGE AND **ADULT** STAGE.



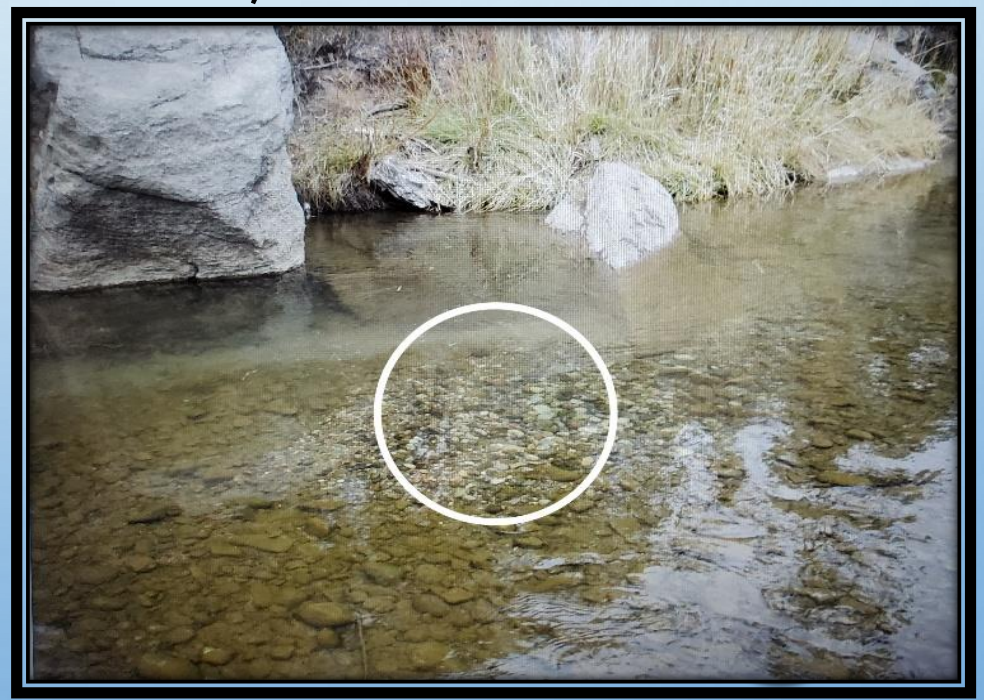
TROUT AND SPAWNING

- **VOCABULARY WORD – SPAWN**. TO PRODUCE OR DEPOSIT A LARGE NUMBER OF EGGS BY A FEMALE AQUATIC ANIMAL LIKE A FISH, CRAB OR FROG.

SPECIES	SEASON	WATER TEMPERATURES	SPAWNING MONTHS
CUTTHROAT	SPRING	45 – 55 DEGREES	APRIL – EARLY JUNE
GILA	SPRING	46 – 55 DEGREES	APRIL – JUNE
RAINBOW	SPRING	45 – 56 DEGREES	FEBRUARY – EARLY MAY
BROWN	FALL	43 – 55 DEGREES	OCTOBER – LATE NOVEMBER
BROOK	FALL	45 – 56 DEGREES	SEPTEMBER – DECEMBER
LAKE TROUT	FALL	45 – 50 DEGREES	OCTOBER – EARLY NOVEMBER
KOKANEE	SUMMER/FALL	45 – 54 DEGREES	AUGUST – EARLY FEBRUARY

TROUT AND SPAWNING

- THE FEMALE MAKES A NEST IN GRAVEL CALLED A REDD. SHE PICKS A GOOD SPOT AND CLEANS THE NESTING AREA WITH HER TAIL FIN AND WILL DEFEND HER REDD FROM OTHER FEMALES.
- THE FEMALE THEN DEPOSITS (LAYS) HER EGGS, BETWEEN 400 – 3,000 EGGS.
- THE MALE WILL FERTILIZE THE EGGS, AND THE FEMALE WILL BURY THE EGGS WITH SMALL GRAVEL.
- THE MALE WILL DEFEND THE REDD AND EGGS FROM OTHER MALE TROUT.
- THE EGGS EVENTUALLY HATCH BETWEEN 60 – 90 DAYS, DEPENDING ON WATER TEMPERATURE.



BROWN TROUT NEST (REDD) IN CIRCLE

PHOTO COURTESY OF ERIC FREY, NMDGF SPORTFISH MANAGER

EMBRYONIC STAGE
EGG

- WITHIN 10–14 DAYS OF FERTILIZATION OF THE EGGS, THE ORANGE-COLORED EMBRYO HAS DEVELOPED SUFFICIENTLY FOR THE EYES TO BE SEEN.
- EGGS THAT HAVE TURNED WHITE ARE NOT FERTILIZED AND WILL NOT HATCH.
- ABOUT 30–60 DAYS AFTER FERTILIZATION, THE TROUT EGGS WILL HATCH DEPENDING ON WATER TEMPERATURES.

MOST TROUT EGGS RANGE

3.5 MM. TO 4.5 MM. IN DIAMETER.

HATCHING STAGE
ALEVIN

- THE TIME OF HATCHING DEPENDS ON THE WATER TEMPERATURE, USUALLY BETWEEN 45 – 55 DEGREES.
- WHEN THE EGGS ARE READY, AN ENZYME IS SECRETED, SOFTENING THE EGGSHELL AND ALLOWING THE TINY SAC-FRY (ALEVIN) TO BREAKTHROUGH.
- THEY ARE ROUGHLY ¾ OF AN INCH IN SIZE AND KEEP THE YOLK SAC FOR 2 – 3 WEEKS.

THE LINE BELOW IS ¾ OF AN INCH.

LARVAL STAGE

- THE ALEVIN'S YOLK SAC WILL BE ITS FOOD SOURCE UNTIL ALL THE YOLK SAC IS ABSORBED.
- THE ALEVIN REMAIN HIDDEN IN GRAVEL IN THE REDD. THEY ARE VERY VULNERABLE AT THIS STAGE TO PREDATORS SUCH AS LARGER FISH AND PREDATORY AQUATIC INSECTS.

JUVENILE FRY, FINGERLING STAGE

- IN 10 – 20 DAYS, THE ALEVIN WILL ABSORB THE YOLK SACK AND EMERGE AS **FRY**. THEY NOW BEGIN TO FEED ON MICROSCOPIC PLANKTON AND FLOATING ORGANIC MATTER.
- FRY ARE ¾ – 1 INCH IN SIZE AND TEND TO STAY NEAR THE REDD AS THEY COMPETE FOR FOOD. AS THE FRY GROW, THEY WILL VENTURE OUT FURTHER IN THE WATER.
- WHEN THE FRY REACH 2 – 3 INCHES, THEY GRADUALLY ACQUIRE THEIR BODY MARKINGS. THEY ALSO BEGIN TO DEVELOP SCALES, AND THEIR FINS START TO FUNCTION.
- WHEN THE FRY ARE BETWEEN 3 – 5 INCHES, THEY ARE AT THE POINT OF DEVELOPMENT WHERE THEY BECOME **FINGERLINGS.**

RAINBOW TROUT FRY

ADULT STAGE

- AS THE FINGERLINGS GROW, THE PARR MARKS FADE AND THE DISTINCTIVE SPOTS SPECKLE THE BODIES.
- OVER THE NEXT FEW YEARS, THE TROUT WILL CONTINUE TO GROW, PRIMARILY EATING AQUATIC INSECTS, TERRESTRIAL INSECTS AND SMALLER FISH.
- IN NEW MEXICO, AN ADULT TROUT IN THE WILD WILL SURVIVE ON AVERAGE THREE TO FIVE YEARS AND GROW AN AVERAGE OF 9 TO 16 INCHES DEPENDING ON FOOD AVAILABILITY AND HABITAT QUALITY.

PHOTO COURTESY OF RICHARD HANSEN, NMDGF COLD WATER SUPERVISOR

NEW MEXICO NATIVE TROUT SPECIES: RIO GRANDE CUTTHROAT TROUT

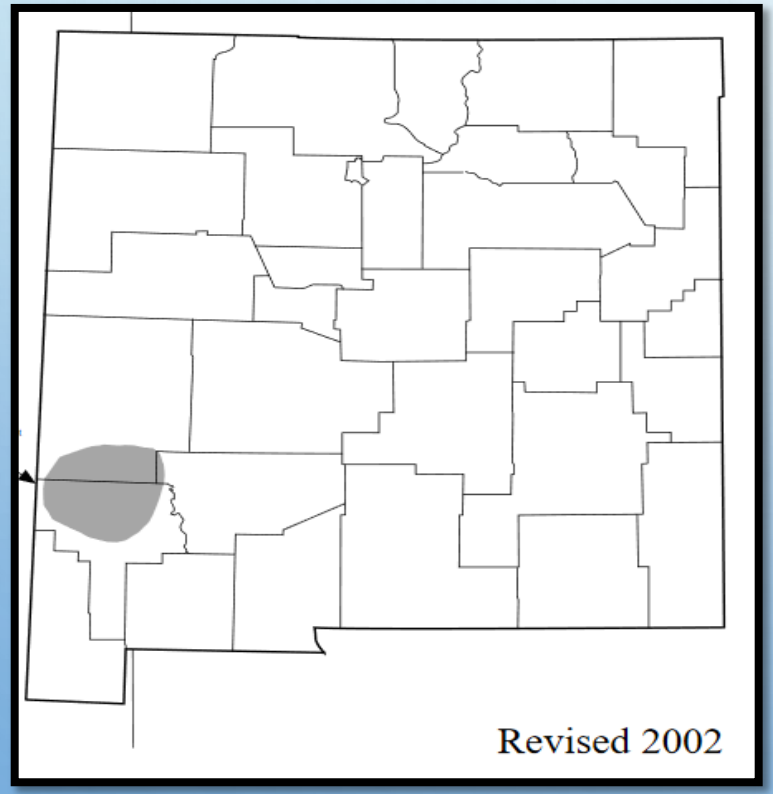
- THE RIO GRANDE CUTTHROAT TROUT IS NATIVE TO NEW MEXICO AND IS THE SOUTHERNMOST SPECIES OF CUTTHROAT TROUT.
- THE RIO GRANDE CUTTHROAT TROUT WAS DESIGNATED THE OFFICIAL STATE FISH OF NEW MEXICO IN 1955.
- THE RIO GRANDE CUTTHROAT TROUT GETS ITS NAME FROM THE RED COLORATION UNDER ITS HEAD.
- RIO GRANDE CUTTHROAT TROUT CAN GROW TO 12 INCHES AND LIVE 5 – 8 YEARS.

NEW MEXICO NATIVE SPECIES: GILA TROUT

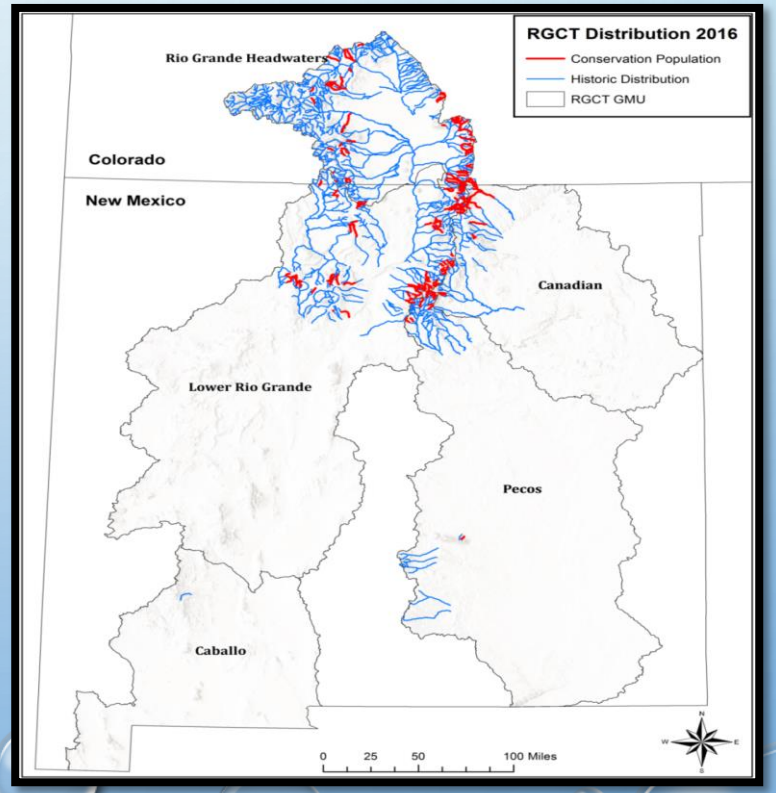
- THE SECOND NATIVE TROUT SPECIES IS THE GILA TROUT.
- THE GILA TROUT WAS TAKEN OFF OF THE ENDANGERED SPECIES LIST IN 2006. IT IS ONLY FOUND IN SOUTHWESTERN NEW MEXICO AND SOUTHEASTERN ARIZONA.
- GILA TROUT CAN GROW TO 12 INCHES AND LIVE 4 – 6 YEARS.

RIO GRANDE CUTTHROAT AND GILA TROUT RANGES

- THE RANGE OF THE GILA TROUT IS LIMITED TO THE GILA RIVER TRIBUTARIES OF SOUTHWESTERN NEW MEXICO AND THE GILA RIVER TRIBUTARIES OF SOUTHEASTERN ARIZONA.
- THE RANGE OF THE RIO GRANDE CUTTHROAT TROUT IS THE STREAMS AND LAKES OF THE RIO GRANDE, CANADIAN AND PECOS RIVERS DRAINAGE SYSTEMS IN COLORADO AND NEW MEXICO.



SHADED AREA IS THE GILA TROUT RANGE IN NEW MEXICO



RIO GRANDE CUTTHROAT TROUT HISTORIC & CURRENT RANGE

NATIVE NEW MEXICO TROUT SPECIES

- THE RIO GRANDE CUTTHROAT HAS RED SLASH MARKS BELOW ITS JAW, GIVING IT ITS NAME.
- CUTTHROATS HAVE LARGE, DARK IRREGULAR SPOTS MOSTLY NEAR THE TAIL.
- THE GILA TROUT HAS A DARK OLIVE-GREEN COLOR ALONG ITS BACK, TURNING TO A GOLDEN – YELLOW BELLY WITH SMALL BLACK SPOTS ALONG ITS BODY.

RIO GRANDE CUTTHROAT TROUT

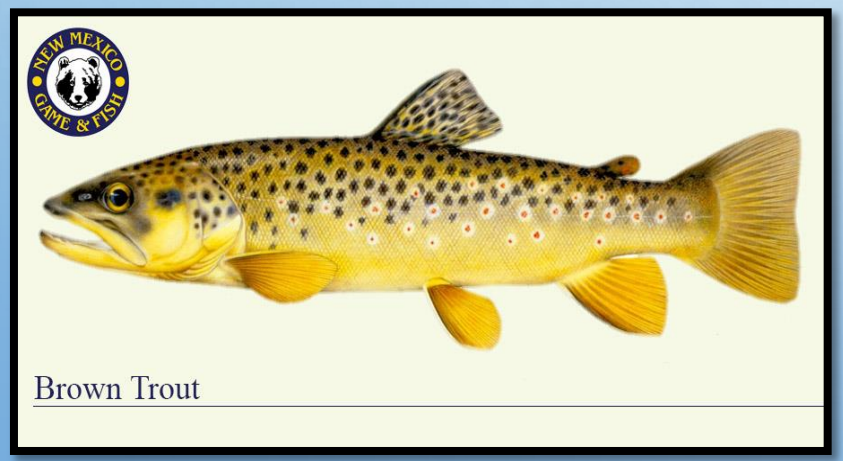
PHOTO COURTESY ART VOLLMER

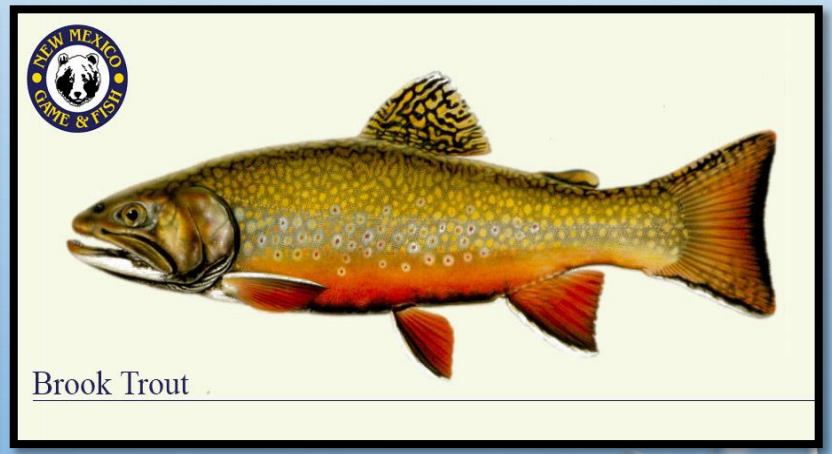
GILA TROUT

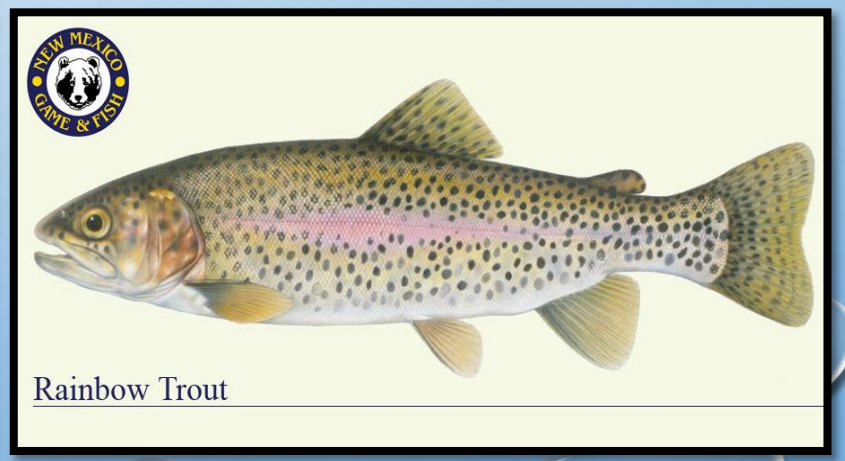
PHOTO COURTESY RYDER PAGGEN, NMDGF

NON-NATIVE TROUT SPECIES

- **BROWN TROUT** – NATIVE TO EUROPE. THE ABDOMEN IS YELLOW WITH LARGE BLACK SPOTS AND SMALLER RED – ORANGE SPOTS WITH WHITE HALOS. BROWN TROUT CAN GROW TO 14 INCHES AND LIVE 5 YEARS.
- **BROOK TROUT** – NATIVE TO THE EASTERN USA. ITS BACK HAS WHITE WAVY LINES, AND ITS BODY IS DARK OLIVE WITH YELLOW – RED SPOTS WITH HALOS ON ITS SIDES. BROOK TROUT CAN GROW 7 – 10 INCHES AND LIVE 2 – 3 YEARS.
- **RAINBOW TROUT** – NATIVE TO THE WESTERN USA. NUMEROUS BLACK SPOTS ON ITS SILVER BODY WITH A PINK STREAK ON ITS SIDES. RAINBOW TROUT CAN GROW TO 20 INCHES OR MORE AND LIVE 7 – 11 YEARS.







NON – NATIVE TROUT SPECIES

BROOK TROUT

PHOTO BY DENNIS SEGURA, NMDGF

BROWN TROUT

PHOTO BY ERIC FREY, NMDGF

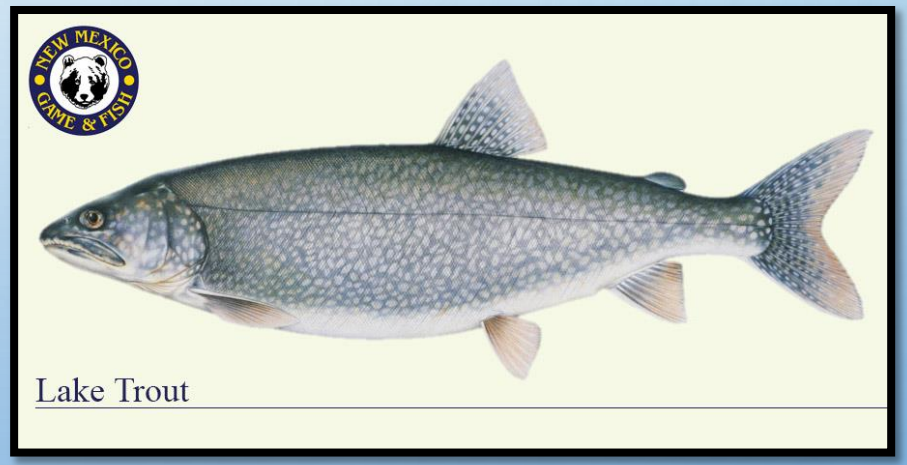
RAINBOW TROUT

PHOTO BY ERIC FREY, NMDGF

LAKE TROUT (CHAR)

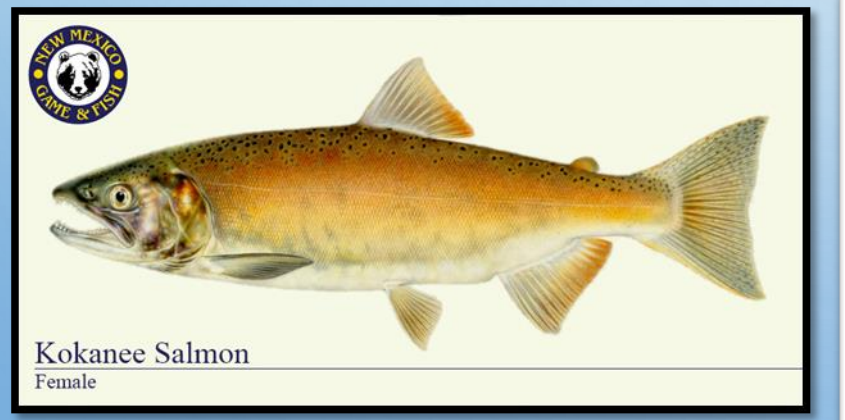
- **LAKE TROUT (CHAR)** ARE LIGHT TO DARK GREEN WITH WHITE SPOTS ON THEIR HEAD, BODY AND TAIL. THEY HAVE A DISTINCT INDENTED TAIL FIN.
- LAKE TROUT ARE NATIVE TO FRESHWATER MOUNTAIN LAKES AND SPEND WINTERS IN FRESH WATER AND SUMMERS IN OCEAN WATER.
- A THRIVING LAKE TROUT POPULATION HAS BEEN ESTABLISHED AT HERON LAKE STATE PARK. LAKE TROUT GROW UP TO 19 INCHES AND LIVE UP TO 25 YEARS. LAKE TROUT EAT SMALLER FISH.

PHOTO COURTESY ERIC FREY, NMDGF



KOKANEE SALMON

- **KOKANEE SALMON-FEMALE.** THE FEMALE HAS A BLUISH GREEN COLOR ALONG ITS BACK WITH SILVERY SIDES.
  - FEMALES TURN A PINKISH RED TO ORANGE HUE ON THEIR SIDES WHEN SPAWNING. KOKANEE SALMON GROW 9 – 12 INCHES.
- **KOKANEE SALMON-MALE.** THE MALE IS A SOLID SILVER COLOR MOST OF ITS LIFE. HOWEVER, AFTER 2 - 4 YEARS A SPAWNING MALE'S APPEARANCE CHANGES DRAMATICALLY FROM SILVER TO A BRIGHT RED-ORANGE.



KOKANEE SALMON, MALE

PHOTO COURTESY ERIC FREY, NMDGF

KOKANEE SALMON – CONTINUED

KOKANEE ARE LAND-LOCKED, FRESHWATER SALMON.

THEIR LIFE SPAN IS 2 – 4 YEARS, AND AT THE END OF THEIR LIVES, THEY RETURN TO THE STREAMS OR LAKE AREAS WHERE THEY WERE BORN TO SPAWN.

KOKANEE AVERAGE 8 – 12 INCHES IN LENGTH AND WEIGH BETWEEN 2 – 6 POUNDS. KOKANEE MAINLY EAT SMALL ZOOPLANKTON.

KOKANEE ARE NATIVE TO THE WESTERN USA.

ALL KOKANEE SALMON DIE AFTER SPAWNING. A THRIVING KOKANEE SALMON POPULATION HAS BEEN ESTABLISHED IN NAVAJO LAKE.

SPAWNING FEMALE

SPAWNING MALE

REVIEW QUESTIONS

1. HOW MANY LIFE STAGES DOES A TROUT GO THROUGH?

2. HOW MANY TROUT SPECIES HATCH IN THE SPRING? (USE TROUT & SPAWNING CHART)

3. HOW MANY TROUT SPECIES HATCH IN THE FALL? (USE TROUT & SPAWNING CHART)

4. WHAT IS THE LOWEST WATER TEMPERATURE A TROUT CAN HATCH IN? WHAT IS THE WARMEST TEMPERATURE A TROUT CAN HATCH IN? (USE TROUT & SPAWNING CHART)

5. WHICH IS THE ONLY SPECIES THAT HATCH IN THE SUMMER/FALL?

6. NAME THE TWO NATIVE TROUT SPECIES.

7. NAME THE THREE NON–NATIVE TROUT SPECIES.

8. WHY DO KOKANEE SALMON TURN BRIGHT ORANGE – RED?

REVIEW QUESTION ANSWERS

1. TROUT GO THROUGH 5 LIFE STAGES.

2. 3 SPECIES HATCH IN THE SPRING.

3. 4 SPECIES HATCH IN THE FALL (KOKANEE HATCH IN THE SUMMER & FALL)

4. 43 DEGREES IS THE LOWEST TEMPERATURE, AND 56 IS THE HIGHEST TEMPERATURE.

5. THE KOKANEE SALMON HATCHES IN THE SUMMER/FALL.

6. THE TWO NATIVE TROUT SPECIES ARE THE RIO GRANDE CUTTHROAT TROUT AND THE GILA TROUT.

7. NON-NATIVE TROUT SPECIES INCLUDE THE BROWN, BROOK AND RAINBOW TROUT.

8. KOKANEE SALMON TURN BRIGHT RED – ORANGE TO SPAWN (MATE).

EXTENSION ACTIVITY

1. HAVE STUDENTS ILLUSTRATE ONE OF THE SEVEN SPECIES OF TROUT/SALMON.

    A. TITLE YOUR ILLUSTRATION. (EXAMPLE) GILA TROUT

    B. DRAW A SIMPLE OUTLINE OF A TROUT. (ANY BASIC FISH OUTLINE WILL DO)

    C. COLOR YOUR FISH THE SAME COLORS AS THE TROUT YOU CHOSE. INCLUDE BODY MARKINGS.

2. HAVE STUDENTS LOOK UP THE FOLLOWING INFORMATION AND INCLUDE IT WITH THEIR ILLUSTRATION.

    A. THE AVERAGE AND THE MAXIMUM LIFESPAN.

    B. THE AVERAGE ADULT SIZE AND THE MAXIMUM SIZE.

    C. ITS PRIMARY DIET.

    D. ORIGINAL HOME OF THE TROUT.

    E. ORIGIN OF THE TROUT'S NAME.

    F. ONE–THREE FUN OR AMAZING FACTS ABOUT YOUR SPECIES OF TROUT.

SOURCES

- ALASKA FISH AND GAME, SALMON ALEVIN: HTTPS://WWW.ADFG.ALASKA.GOV/STATIC/EDUCATION/EDUCATORS/CURRICULA/PDFS/SALMON_IN_THE_CLASSROOM_UNIT_6_ALEVIN.PDF (SLIDE # 8)
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- NEW MEXICO GAME AND FISH/ARIZONA GAME AND FISH/U.S. WILDLIFE SERVICE/U.S. FOREST SERVICE (GILA TROUT): HTTP://WWW.WESTERNNATIVETROUT.ORG/MEDIA/TROUT/WNTI-GILA-TROUT-2016-STATUS-REPORT.PDF (SLIDE # 11, 12, 13,14, 15, 17, 18 , 19)
- MINNESOTA DEPARTMENT OF NATURAL RESOURCES, MINNAQUA AQUATIC PROGRAM: HTTPS://WWW.LAKESUPERIORSTREAMS.ORG/UNDERSTANDING/RAINBOWTROUT.HTML (SLIDE # 8)
- SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES, TROUT LIFE CYCLE: HTTPS://WWW.DNR.SC.GOV/AQUATICED/TROUT/CYCLE.HTML (SLIDES #9, 10)
- TROUT UNLIMITED, TROUT IN THE CLASSROOM: HTTPS://WWW.TU.ORG/CONSERVATION/OUTREACH-EDUCATION/HEADWATERS-YOUTH-PROGRAM/EXPLORE-WATERSHEDS/TROUT-IN-THE-CLASSROOM/ (SLIDES #2, 3, 4, 5, 6, 7, 8)
- WILD TRUST TROUT, TROUT LIFECYCLE – SPAWNING: HTTPS://WWW.WILDTROUT.ORG/CONTENT/TROUT-LIFECYCLE (SLIDES # 4, 5, 6, 7)