

Names: _____

Date: _____

Creek Monitoring

Water Quality

Salmon and steelhead need water that is cool, clear, oxygenated, and free of pollution. Use a water quality testing kit to measure the following parameters. Follow the directions provided on the testing kit. Mark on your map where the water was collected.

	Your Reading	Suitable Range for Local Salmon/Steelhead
Temperature:	_____	_____
Turbidity:	_____	0-10 NTU
pH:	_____	6.5-8.5
Dissolved Oxygen (DO):	_____	6 parts per million or more
Coliform Bacteria:	_____	0-200 colonies per ml
Other tests:		
_____	_____	_____
_____	_____	_____
_____	_____	_____

Riffles, Runs, and Pools

A healthy salmon stream has riffles, runs, and pools.

- A riffle is a shallow area of a stream where water flows rapidly over a rocky or gravelly streambed. It shows up as ripples on the water surface. Riffles oxygenate the water (put oxygen into it), are good bug habitats, and are where salmon and steelhead make their redds, or nests.
- A run is an area of the stream where the water is traveling pretty fast, but doesn't show ripples.
- A pool is a deep area of a stream where the water flows very slowly. Salmon and steelhead hang out in pools because it is deeper and safer here than in open areas of the creek. The deeper water provides cover from predators such as birds.

1. Count the number of riffles, runs, and pools you see along this section of the creek:

Riffles _____ Runs _____ Pools _____

2. Add the riffles, runs, and pools to your creek map.

3. If you can do it safely, measure the width and the depth of one of the pools:

Width _____ Depth _____

4. Are the pools related to any other features in the stream, such as waterfalls, boulders, or logs? What do you think would happen to the pools if there were no logs or boulders in the creek?

Cover

Tree branches hanging over the creek provide shade, which helps to keep the water cool for salmon. The roots of trees and shrubs also stabilize the banks of the creek so that silt does not clog the creek bed. Logs and large branches in the water give salmon and steelhead places to hide.

1. Count the number of trees along this stretch of the creek: _____
2. Looking straight up, estimate the percentage of the sky over the creek that is covered by trees and shrubs: ___ 100% ___ 75% ___ 50% ___ 25% ___ 0%
3. Show the overhead cover on your creek map. Also show on your map any logs or large branches in the creek.

Gravel

A healthy salmon and steelhead creek bed consists of three sizes of rocks:

- Gravel (2 cm to 64 cm – from pea size to lemon size) is used for spawning nests.
- Cobble (64 cm to 256 cm – from lemon size to basketball size) stabilizes the creek bed.
- Boulders (larger than 256 cm – basketball size and up) are used by salmon and steelhead for shelter.

Other streambed materials are bedrock and fine sediment. Bedrock is solid ground that does not wash away; while fine sediment – sand, very small rocks, clay, or dirt – easily washes downstream.

1. Find an area along the creek where there is a stretch of rock or gravel. Lay the measuring tape along its length. One participant stands at each foot mark (or 30 cm mark) on the tape so that the toe of his or her shoe is even with the mark. Without looking, reach down and touch the rock or stone that is at the end of the shoe. Pick it up and measure it with a ruler. Record below.
2. Repeat this process until your team has measured a sample at each mark along the tape. Record where the rock is from (like “2-foot mark”) and its size. Then, classify each rock as gravel, cobble, or boulder.

Where from: _____	Size of rock: _____	Type of rock: _____
Where from: _____	Size of rock: _____	Type of rock: _____
Where from: _____	Size of rock: _____	Type of rock: _____
Where from: _____	Size of rock: _____	Type of rock: _____
Where from: _____	Size of rock: _____	Type of rock: _____

3. Looking at the creek, can you see areas in it with gravel, cobble, and boulders? Mark these areas on your map.

Stream Velocity

The stream velocity is how fast the water is going. Salmon and steelhead prefer water that is moving, but not moving too fast (usually less than 4 feet per second or 1.2 meters per second). If the water is moving faster than they like, the fish will stay behind rocks and logs, or near the bottom or banks, then dart out briefly into faster water to chase prey.

1. Place a flag or marker on the edge of the creek near a run (see Riffles, Runs, and Pools above). Using a tape measure, measure out 10 yards (or meters) along the edge of the creek. Keep the tape measure as straight as possible and parallel to the creek direction. Place a flag or marker at the 10-yard (or meter) mark.
1. To measure stream velocity, drop an orange or stick in the water at the first marker and time with a stopwatch how long it takes to reach the second marker.

Time to go 10 yards (or meters): _____
 What is that in feet (or meters) per second? _____

2. Mark on your map where you measured the velocity.
3. Notice whether the velocity is the same all across the creek. Mark on your map places where it seems to be slower or faster than the area you measured.

Salmon and Steelhead Scan

Approach the creek very quietly and slowly from the downstream end of the site. Stay low so that it is harder for fish to see you. Since fish usually face upstream looking for food, they may not see you at first if you move from downstream to upstream. Using polarized sunglasses to help cut any glare (if you have them), look for salmon and/or steelhead in the water. If you don't have sunglasses, look for them in the shaded areas of the creek.

If you see any salmon or steelhead, describe what they look like and what they are doing.

Names/ Nombres: _____

Date/ Fecha: _____

Creek Monitoring *Vigilando el Riachuelo*

Water Quality / Calidad del Agua

Salmon and steelhead need water that is cool, clear, oxygenated, and free of pollution. Use a water quality testing kit to measure the following parameters. Follow the directions provided on the testing kit. Mark on your map where the water was collected.

Salmón y trucha del mar (steelhead) necesitan agua fresca, clara, oxigenado, y libre de contaminación. Use un equipo de prueba de la calidad del agua para medirlos parámetros siguientes. Siga las direcciones indicadas en el equipo de prueba de la calidad del agua. Marque en su mapa donde recogió el agua.

	Your Reading <i>Su medida</i>	Suitable Range for Local Salmon/Steelhead <i>Gama apropiada para Salmón y Trucha del mar locales</i>
Temperature / <i>Temperatura</i> : _____	_____	_____
Turbidity / <i>Turbiedad</i> : _____	_____	0-10 NTU
pH / <i>pH</i> : _____	_____	6.5-8.5
Dissolved Oxygen (DO) / <i>Oxígeno disuelto</i> : _____	_____	6 parts per million or more
Coliform Bacteria / <i>Bacterias del coliform</i> : _____	_____	0-200 colonies per mL
Other tests / <i>Otros análisis</i> : _____ _____ _____	_____ _____ _____	_____ _____ _____

Riffles, Runs, and Pools / Riffles, Fluyes, y Charcas

A healthy salmon stream has riffles, runs, and pools.

Un arroyo saludable para salmón tiene riffles, fluyes y charcas.

- A riffle is a shallow area of a stream where water flows rapidly over a rocky or gravelly streambed. It shows up as ripples on the water surface. Riffles oxygenate the water (put oxygen into it), are good bug habitats, and are where salmon and steelhead make their redds, or nests.

Un riffle es un área que no es profundo del arroyo donde el agua corre rápidamente sobre un fondo rocoso y con grava. Se muestra como ondulaciones en la superficie del agua. Riffles oxigenen el agua (le meten oxígeno), son buenos habitat para insectos, y son donde salmón y trucha del mar hacen sus jerarquías.

- A run is an area of the stream where the water is traveling pretty fast, but doesn't show ripples.

Un fluye es un área del arroyo donde el agua corre rápido, pero no tiene ondulaciones.

- A pool is a deep area of a stream where the water flows very slowly. Salmon and steelhead hang out in pools because it is deeper and safer here than in open areas of the creek. The deeper water provides cover from predators such as birds.

Una charca es un área profundo del arroyo donde el agua corre bien despacio. Salmón y trucha del mar se mantienen en las charcas porque es más seguro allí que en las áreas abiertas del riachuelo. La profundidad del agua les da cubierta de los depredadores como aves.

1. Count the number of riffles, runs, and pools you see along this section of the creek:

Cuente el número de riffles, fluyes, y charcas que ve a lo largo de esta sección de la riachuelo:

Riffles/ Riffles _____ Runs/ Fluyes _____ Pools/ Charcas _____

2. Add the riffles, runs, and pools to your creek map

Agregue los riffles, fluyes, y charcas a su mapa del riachuelo

3. If you can do it safely, measure the width and the depth of one of the pools:

Si puede cuidadosamente, mida la anchura y la profundidad de una de las charcas:

Width/ Anchura _____ Depth/ Profundidad _____

4. Are the pools related to any other features in the stream, such as waterfalls, boulders, or logs? What do you think would happen to the pools if there were no boulders or logs in the creek?

¿Están relacionadas las charcas con otras características del arroyo, como cascadas, cantos rodados, y registros? ¿Que piensa que les pasaría a las charcas si no hubieran cantos rodados y registros en el riachuelo?

Cover / Cubierta

Tree branches hanging over the creek provide shade, which helps to keep the water cool for salmon. The roots of trees and shrubs also stabilize the banks of the creek so that silt does not clog the creek bed. Logs and large branches in the water give salmon and steelhead places to hide.

Ramas de los árboles que cuelgan sobre el riachuelo proporcionan sombra, que ayuda en mantener el agua fresca para el salmón. Las raíces de los árboles y los arbustos estabilizan los bancos del riachuelo para que el lodo no estorbe el fondo del riachuelo. Registros y ramas grandes en el agua les dan al salmón y trucha del mar lugares para esconderse.

1. Count the number of trees along this stretch of the creek: _____

Cuente el número de árboles que están a lo largo de esta sección del riachuelo

2. Looking straight up, estimate the percentage of the sky over the creek that is covered by trees and shrubs: ___ 100% ___ 75% ___ 50% ___ 25% ___ 0%

Mirando directamente arriba, calcule el porcentaje del cielo que está cubierto por los árboles y arbustos.

3. Show the overhead cover on your creek map. Also show on your map any logs or large branches in the creek.

Demuestre esa cubierta en su mapa del riachuelo. También demuestre en su mapa cualquier canto rodado y registro.

Gravel / Grava

A healthy salmon and steelhead creek bed consists of three sizes of rocks:

Un fondo del riachuelo sano para salmón y trucha del mar contiene piedras de tres tamaños:

- Gravel (2 cm to 64 cm – from pea size to lemon size) is used for spawning nests.
Grava (2 cm a 64 cm – del tamaño del chicharro al tamaño del limón) se usa para frezar jerarquías.
- Cobble (64 cm to 256 cm – from lemon size to basketball size) stabilizes the creek bed.
Piedrin (64 cm a 256 cm – del tamaño del limón al tamaño del baloncesto) estabiliza el fondo del riachuelo.
- Boulders (larger than 256 cm – basketball size and up) are used for shelter.
Cantos rodados (más grande que 256 cm – del tamaño del baloncesto al más grande) se usa para abrigarse.

Other streambed materials are bedrock and fine sediment. Bedrock is solid ground that does not wash away; while fine sediment – sand, very small rocks, clay, or dirt – easily washes downstream.

Otros materiales del fondo del arroyo son roca de fondo y sedimento. Roca de fondo es suelo sólido que no se erosione; pero el sedimento – arena, piedras chiquitas, arcilla, o tierra – se erosione a causa de la corriente.

1. Find an area along the creek where there is a stretch of rock or gravel. Lay the measuring tape along its length. One participant stands at each foot mark (or 30 cm mark) on the tape so that the toe of his or her shoe is even with the mark. Without looking, reach down and touch the rock or stone that is at the end of the shoe. Pick it up and measure it with a ruler. Record below.

Encuentre un área del riachuelo donde hay un parte de piedra o grava. Ponga la cinta métrica a lo largo del área. Un participante se para en la marca de 1 pie (o 30 cm) en la cinta para que su dedo este pleno con la marca. Sin mirar, estréchese para tocar la piedra que está en frente del zapato. Recójala y mídala con una regla. Apunte el dato en el lugar indicado.

2. Repeat this process until your team has measured a sample at each mark along the tape. Record where the rock is from (like “2-foot mark”) and its size. Then, classify each rock as gravel, cobble, or boulder.

Repita este proceso hasta que su grupo ha medido cada marca a lo largo de la cinta. Apunte de donde viene la piedra (por ejemplo “a 2 pies”) y el tamaño. Entonces clasifique la piedra como grava, piedrin, o canto rodado.

Where from/ *De donde viene*: _____ Size of rock/ *Tamaño de piedra*: _____
Type of rock/ *Clase de piedra*: _____

Where from/ *De donde viene*: _____ Size of rock/ *Tamaño de piedra*: _____
Type of rock/ *Clase de piedra*: _____

Where from/ *De donde viene*: _____ Size of rock/ *Tamaño de piedra*: _____
Type of rock/ *Clase de piedra*: _____

Where from/ *De donde viene*: _____ Size of rock/ *Tamaño de piedra*: _____
Type of rock/ *Clase de piedra*: _____

Where from/ *De donde viene*: _____ Size of rock/ *Tamaño de piedra*: _____
Type of rock/ *Clase de piedra*: _____

3. Looking at the creek, can you see areas in it with gravel, cobble, and boulders? Mark these areas on your map.

Mirando el riachuelo, puede ver áreas con grava, piedrin, y cantos rodados? Apunte estas áreas en su mapa.

Stream Velocity / *Velocidad del Arroyo*

The stream velocity is how fast the water is going. Salmon and steelhead prefer water that is moving, but not moving too fast (usually less than 4 feet per second or 1.2 meters per second). If the water is moving faster than they like, the fish will stay behind rocks and logs, or near the bottom or banks, then dart out briefly into faster water to chase prey.

La velocidad del arroyo es cómo rápidamente mueve el agua. Salmón y trucha del mar prefieren agua mueve, pero que no se mueve muy rápido (en general menos que 4 pies por segundo o 1.2 metros por segundo). Si el agua mueve más rápido que les gustan, el salmón y la trucha del mar se esconden detrás de piedras y registros, o en el fondo o bancos, y de allí saltan brevemente al agua de alta velocidad para seguir presa.

1. Place a flag or marker on the edge of the creek near a run (see Riffles, Runs, and Pools above). Using a tape measure, measure out 10 yards (or meters) along the edge of the creek. Keep the tape measure as straight as possible and parallel to the creek direction. Place a flag or marker at the 10-yard (or meter) mark.

Ponga una bandera o un marcador al borde del riachuelo o cerca de un fluye (revise Riffles, Fluyes, y Charcas). Use la cinta métrica, mida 10 yardas (o metros) al borde del riachuelo. Mantenga la cinta métrica lo más recto posible y paralelo al riachuelo. Ponga una bandera o un marcador en la medida de 10-yardas (o metros).

2. To measure stream velocity, drop an orange or stick in the water at the first marker and time with a stopwatch how long it takes to reach the second marker.

Para medir la velocidad del arroyo, meta una naranja o un palillo en el agua en el primer marcador y tome tiempo con un reloj cronómetro para ver cuánto tiempo se toma en llegar al segundo marcador.

Time to go 10 yards (or meters) / *Tiempo para recorrer 10 yardas (o metros):* _____

What is that in feet (or meters) per second? / *Calcule esa respuesta en pies (o metros) por segundo:* _____

2. Mark on your map where you measured the velocity.

Marque en su mapa donde tomó la velocidad.

3. Notice whether the velocity is the same all across the creek. Mark on your map places where it seems to be slower or faster than the area you measured.

Preste atención a la velocidad a lo largo del arroyo; ¿es igual por todo el arroyo? Apunte en su mapa los lugares donde la corriente se mueve más rápida o más lenta que el área usted midió.

Salmon and Steelhead Scan / *Búsqueda de Salmón y Trucha del mar*

Approach the creek very quietly and slowly from the downstream end of the site. Stay low so that it is harder for fish to see you. Since fish usually face upstream looking for food, they may not see you at first if you move from downstream to upstream. Using polarized sunglasses to help cut any glare (if you have them), look for salmon and/or steelhead in the water. If you don't have sunglasses, look for them in the shaded areas of the creek.

Acerque al riachuelo contra de la corriente, de manera tranquila y cuidadosa. Agáchese para que los peces no le vean a usted. Los peces buscan comida contra la corriente así que pueden no verle al principio si usted se contra la corriente. Usando lentes del sol polarizados (si los tiene) para desviar el reflejo, busque salmón y trucha del mar en el agua. Si no tiene lentes del sol, búselos en las áreas del riachuelo con sombra.

If you see any salmon or steelhead, describe what they look like and what they are doing.

Si ve salmón o trucha del mar describa como parecen y que están haciendo.
