Wildlife Supply Company®

A Comprehensive Guide to Wildco® Benthic Samplers

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INTRODUCTION TO WILDCO

Wildlife Supply Company was established in 1938 by the Trippensee brothers, Dr. Rueben and Herbert. Dr. Rueben was a professor at the University of Massachusetts for 30 years. His two published texts on wildlife management have long served as references in their field. The company remained in the Trippensee family for over 60 years.

The company changed hands in 2000, when it was purchased by the Bell family.

Wildco has always been a family business, whether the family is the Trippensees or the Bells. Because of this, the owners think long term. You can count on sturdy, reliable products that give you the ability to compare your samples to data of past decades.

INTRODUCTION TO BENTHIC GRABS:

Wildco benthic grabs are designed to take samples of sediment. These sediments have usually been accumulated at the bottom of lakes and rivers. The type of sediment present determines which sampler you should use.

There are three types of grabs: center pivot, clamshell, and sleds. Center pivots cause minimal disturbance of bottom sediments, are thus are better for sensitive areas. Clamshell pivots cause structural disturbance of bottom sediments. Sleds or drags are best for collecting mixed samples.

Ponar grabs are available with stainless steel components, or all stainless steel for more extreme environments. Stainless steel is a wonderfully durable material that resists damage and corrosion; however, it is costly. Those on a tight budget would do well to consider a Ponar with some galvanized steel components.

Wildco Pinch Pin

The secret of most benthic grabs is the pinch pin. This unit holds the arms of center pivot grabs in place as long as there is stress on the sampler, such as its own weight hanging from a line. When the sampler reaches the bottom, the tension disappears, and the spring pushes the pin out. This in turn closes the instrument.

HOW TO CHOOSE THE RIGHT SAMPLER:

Center pivot grabs are the most popular style, in part because they cause very little damage to the sediment layer. They are also suitable for a wide variety of sampling conditions, making them versatile. However, there is a chance that macroscopic organisms will be damaged as the scoops close together.

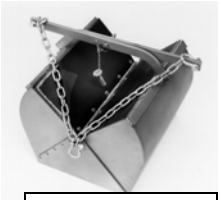
Clamshell samplers pull in samples like a pair of hands, and thus are less likely to damage fauna than some of the larger center pivot samplers.

Sleds sample the topmost layer of sediments, and are best suited for doing studies of benthic organisms. Unlike the larger grabs, these do not bite into the bottom sediments to any great depth. Instead, the skim a shallow layer from the top over a wide area.

Below are some common sampling environments, listed together with the best equipment for the job. Please be advised that our benthic samplers will work well in most conditions. When in doubt, it is better to get a heavier duty sampler.

Soft Bottoms: For sampling in soft sediments such as muck, mud, ooze, and other similar situations, a number of options are available. The popular Ekman sampler is lightweight, economical, and designed with these conditions in mind. Springs push the scoops together when the sampler hits bottom; however, these springs have limited strength and are easily blocked by vegetation and gravel. The Ekman has an optional handle, which is useful for sampling while wading in shallow water.

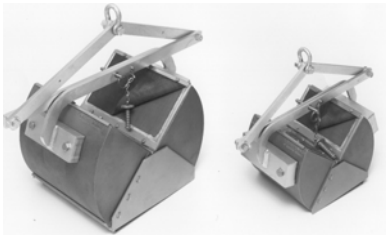
Ekman Grab



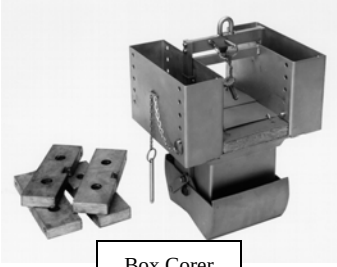
VanVeen Grab

If the conditions are slightly less favorable than listed above or more volume is required, try the Van Veen grab. It is heavier than an Ekman, but can tolerate adverse conditions better and has a 24L capacity. It works well in sand and other soft bottom conditions. Van Veens can be Teflon coated for metal sampling. Please call for details.

Hard Bottoms: Ponars and petite Ponars are ideal for this purpose. When either strikes the bottom, its weight and tapered edges bite deeply into the sediments, even if they are hard packed. Ponars work in fresh or salt water, but be advised that for salt water work the all stainless steel units function better. Weights are available in increase the cutting power. A petite Ponar is a smaller, lighter version of the Ponar and is very popular. Ponars can be Teflon coated for metal sampling, please call for details.



Ponar Grabs

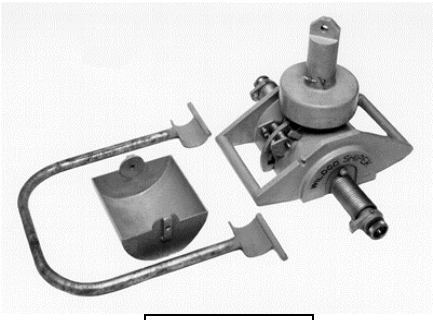


Box Corer

If the Ponars are unsuitable for your needs, consider the Box Corer. This unit uses its own weight to dig deep into even very hard sediments. With the optional weights, the box corer can total 127 lbs. An acrylic liner slides into the unit, making sample removal easy. Standard box size is 6" x 6" x 9". Custom sizes are available, please call for details.

Benthic Organisms: To capture bottom dwelling creatures for study, you will need a specialized grab. Petersen grabs, a clamshell design, work well for this. The clamshell design is less likely to damage organisms by catching them in the jaws of the unit. This heavy device bites deeply into sediments. Note: the Petersen grab is **not** designed for salt water use. For that, it must be painted for protection.

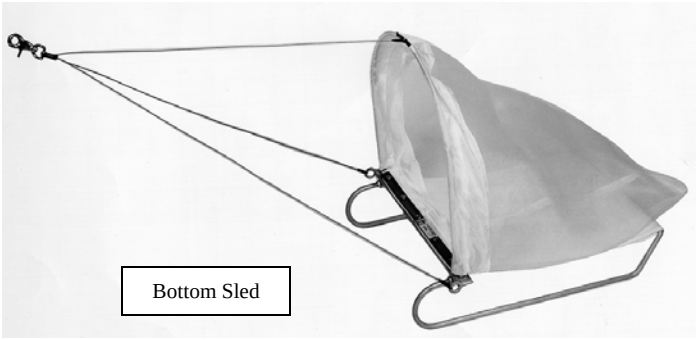
Peterson Grab



Shipek Grab

Another useful grab is the Shipek. This unit is designed for studies of large inland bodies or fast flowing marine waters. However, it is useful for nearly any type of sampling. It can operate in soft oozes or hard packed silts. It operates by rotating an inner scoop 180 degrees against an outer scoop to seal in sample. Powerful springs ensure that even pebbles 2cm to 5cm in diameter do not impede the unit. The scoops remain closed due to the residual torque of the springs. The Shipek will gather a large amount of non-sessile life forms. Downsides to the Shipek include high cost, higher weight, and two person operation.

In addition to grabs, sleds are useful for organism studies. Our bottom sled and biological dredge work on a similar principle: dragged by a boat, they collect the top layer of sediment and shoot it into a net. This net filters out sediments, leaving benthic organisms trapped. The bottom sled is good for smaller specimens such as invertebrates, while the biological dredge is better suited for larger forms, like shellfish and sponges. Because dredges are dragged along the bottom, the collect mixed samples. This can be useful if you wish to sample a large area at once.



Bottom Sled

Rough Conditions: When sampling in salt water, or if the bottom contains sharp rocks or other obstacles, some samplers will work better than others. An all stainless steel

Ponar will tolerate nearly any sampling condition. Van Veen grabs are also very durable. The Shipek grab is very robust and can be used for oceanic sampling.

Stainless Steel vs. Steel: Some of our samplers come with an option: stainless steel scoops only, or entirely stainless steel. Which is right for you? It depends on your sampling environment. Stainless steel resists corrosion and is very durable, but more expensive than galvanized steel. If you are sampling in stagnant, fresh water, such as a small lake, then an all stainless instrument is probably more than you need. Conversely, if you wish to sample in brackish or marine waters, or if the bottom conditions are rough, an all stainless sampler will be more suitable.

Metal Sampling: All of our benthic samplers use large amounts of metal in their construction. However, some of them can be Teflon coated to prevent contamination of a sample when doing trace metal studies. Ponar grabs and Van Veen grabs can be Teflon coated, please call for details.

SAMPLER COMPARISON

Catalog number	**Std. Ekman 196-B12**	**Tall Ekman 196-F62**	**Large Ekman 197-C12**	**Petite Ponar 1728-G30**	**Std. Ponar 1725-F10**
Box Size	15 x 15 x 15 cm (6 x 6 x 6 in)	15 x 15 x 23 cm (6 x 6 x 9 in)	32 x 32 x 32 cm (9 x 9 x 9 in)	15 x 15 cm (6 x 6 in)	23 x 23 cm (9 x 9 in)
Bite Depth	15.2 cm (6 in)	22.9 cm (9 in)	22.9 cm (9 in)	7cm (2.75 in)	8.9 cm (3.5 in)
Screen Mesh	none	none	none	500 µm	500 µm
Dry Weight	3 kg (7 lb)	5 kg (11 lb)	7 kg (15 lb)	11 kg (24 lb)	23 kg (50 lb)
Leiden Weight	16 kg (35 lb)	21 kg (46 lb)	38 kg (83 lb)	14 kg (30 lb)	34 kg (75 lb)
Extra Weights	3 kg (7 lb)	3 kg (7 lb)	none	4 kg (8 lb)	4 kg (8 lb)
Shipping Weight	7 kg (15 lb)	8 kg (18 lb)	15 kg (33 lb)	11 kg (24 lb)	23 kg (50 lb)
Volume of Scoops	3.5 liters (214 cu in)	5.3 liters (323 cu in)	11.9 liters (726 cu in)	2.4 liters (145 cu in)	8.2 liters (500 cu in)
Sample Area	232 sq cm (36 sq in)	232 sq cm (36 sq in)	522 sq cm (81 sq in)	232 sq cm (36 sq in)	522 sq cm (81 sq in)
Footprint	24 x 22 cm (9.5 x 8.5 in)	24 x 22 cm (9.5 x 8.5 in)	35.5 x 33 cm (14 x 13 in)	41 x 29 cm (16 x 11.5 in)	55 x 25 cm (21.5 x 10 in)
Required Accessories	**62-C15** Poly Line **66-A50** Reel	**62-C15** Poly Line **66-A50** Reel	**62-C15** Poly Line **66-A50** Reel	**61-B14** Cable **66-C10** Winch or **62-C15** PolyLine	**61-B14** Cable **66-C10** Winch or **66-C52** Mount

Catalog number	Shipek Grab 860-A10	Petersen 1750-G30	VanVeen 1775-A10	Box Corer 191-A12
Box Size	20 x 20 cm (7.8 x 7.8 in)	30 x 30 cm (12 x 12 in)	36 x 28 cm (14 x 11 in)	15 x 15 x 23 cm (6 x 6 x 9 in)
Bite Depth	10.2 cm (4 in)	14 cm (5.5 in)	11.4 cm (4.5 in)	22.9 cm (9 in)
Screen Mesh	none	none	500 µm	500 µm
Dry Weight	61 kg (134 lb)	34 kg (75 lb)	21 kg (46 lb)	14 kg (31 lb)
Leiden Weight	69 kg (152 lb)	61 kg (135 lb)	up to 90 kg (200 lb)	50 kg (110 lb)
Extra Weights	none	8 kg (18 lb)	none	49 kg (108 lb)
Shipping Weight	91 kg (220 lb)	50 kg (160 lb)	41 kg (90 lb)	42 kg (93 lb)
Volume of Scoops	3 liters (183 cu in)	9.9 liters (604 cu in)	24 liters (1465 cu in)	5.3 liters (323 cu in)
Sample Area	400 sq cm (62 sq in)	928 sq cm (144 sq in)	993 sq cm (154 sq in)	232 sq cm (36 sq in)
Footprint	56 x 109 cm (22 x 43 in)	65.4 x 33 cm (25.75 x 13 in)	56 x 38 cm (22 x 15 in)	35.5 x 24 cm (14 x 9.5 in)
Required Accessories	**61-B14** Cable **81-A10** Crane	**61-B14** Cable **81-A10** Crane	**61-B14** Cable **85-E10** Winch	**61-B14** Cable **81-A10** Crane

PREPARATION FOR SAMPLING**:** Regardless of which sampler you choose, there are certain steps which should be performed before hand to ensure the best sample is acquired.

All samplers should be **thoroughly cleaned** before use, including the first use. This can be done by thoroughly rinsing the sampler in distilled water, to remove any possible contaminant. Do not use soap because you will strip away oil which lubricates the instrument. Distilled water, steam, and lightly concentrated alcohol solutions work well.

Keep lightly oiled and/or greased! Lever arm pivots, hinge pin, and other joints must be kept oiled to ensure the sampler will continue to close properly. To keep the sampler working correctly, use a high grade automotive grease at all pivot or joint areas where the metal moves against itself. Clean and adjust for smooth, easy motion. **Note:** if your sampler will be out of service for some time, coat the surfaces with oil or another rust barrier. Although our samplers use stainless steel in part or all of their construction, this protective layer will prolong the life of the sampler even further.

Inspect the edges of the scoops after each sample drop. Severe nicks or dents can interfere with the closing of the scoops, or allow sample to escape. Such damage may require reworking the scoops.

Hard Water can cause buildups of calcium carbonate and other insoluble particles. If left unchecked, this can lock the hinges or lever arms in place, preventing the sampler from functioning. After each sampling session in such environments, it is best to soak the entire unit in a 3 N solution of nitric, sulfuric or hydrochloric acid. These solutions will remove the scale without damaging the metal or plastic parts. Limit soaking time to 30 minutes. Rinse thoroughly. Check it carefully by eye. Repeat as necessary.

Bottom Sampling Criteria: The requirements of bottom sampling are so diverse that no one sampler has been devised which will serve all purposes. For preliminary or reconnaissance work, certain simple forms of samplers may be used in most situations. For more precise work, however, the instrument must be chosen in accordance with the particular needs of the program and the structure of bottom materials. Considerations include:

• General purpose of the project as a whole
• Nature of the bottom - kind of materials and degree of uniformity
• Types of analyses to be made
• How the results will be used.

Important to the success of the project is the taking of samples that are accurately representative of the entire area. Since no two sampling projects are identical as to physical properties and problems encountered, no predetermined guidelines can be formulated to assure this. Therefore you must rely upon the experience and expertise of the people doing the sampling. Individual sample size must also be determined by sampling methods used and the physical character of bottom materials.

General types of sampling techniques include:

• Horizontal sampling over the selected area. This may be performed by the random sampling method or by distribution of individual samples along transects planned in advance.
• Vertical, seasonal and special sampling requires advanced planning dictated by work objectives.
• To take small sub-samples, keep the scoops closed and slide open the top of the sampler. Then push several small diameter clear plastic tubes through the collected sample down to the scoops. Withdraw the tubes and throw back the balance of the sample.

PERSONAL SAFETY: Benthic samplers can be heavy pieces of equipment, especially when loaded with sediment. Ekmans are the lightest at 7lbs, while Shipeks weigh in at 134 lbs (dry weight). Regardless of the weight, these samples may cause injury if dropped on toes or other appendages. In addition, **spring loaded grabs, such as Ekmans and Shipeks, can cause injury if the scoops close on fingers. Extreme caution must be exercised with regards to the Shipek because of the power stored in the springs. Un-cock springs when not in use; this will improve safety and prolong the life of the springs**.

If you are sampling from a boat, please ensure that the boat is balanced before you sample. Leaning over the side with a heavy sampler in hand is enough to capsize smaller vessels. To help mitigate this, have your partner sit on the other side to balance you out.

SPECIFIC SAMPLER INSTRUCTIONS:

This section is devoted to individual models of samplers, with specific instructions for each.

Ekman 196-B12, 196-F62, 197-C12: The Ekman Bottom Grab is a light weight bottom grab designed to collect samples in soft, finely divided sediments free from vegetation and intermixtures of sand, stones and other coarse debris. It samples well on substrate composed of finely divided muck, mud, ooze, submerged marl or fine peaty materials.

For safety, please follow these guidelines:

1. **Be sure to keep the boat in proper balance at all times.**
   a. Using the Ekman grab and washing those contents may require leaning over the side of the boat.
   b. Keep your balance!
2. **Personal injury can be caused by the closing of the sharpened scoops.**
   a. This can be caused by accidentally depressing the stainless steel strike pad or depressing its pins.
   b. Handle the Ekman Grab very carefully when the springs are set and the cable loops are hooked (armed) on the Twin Pin™ release mechanism. The Ekman spring-loaded jaws are potentially dangerous; extreme care must be exercised when setting the jaws.
3. **To prevent injury and to extend the life of the springs, unhook (unload) both springs from their scoop buttons after each sampling session. This helps to prevent a "set" from taking place in the springs.**

To sample most effectively, we recommend you assemble the following equipment prior to use:

- **Ekman Dredge**
- **Line** *We suggest 3/16-inch line such as Wildco® No. 62-C15.*
- **Sieve or Screen** *A 500 micron mesh screen is most commonly recommended for benthic invertebrate sampling. The Wildco® Wash Frame (No. 188-E50) would work well with the Large Ekman. The Wildco® Wash Bucket (No. 190-E25) can be used with the standard & tall Ekmans.*
- **Large-size tubs or other containers are often helpful**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*
- **Light-duty crane or winch** *The large Ekman can weigh over 80 pounds (35 kg) when full. The Wildco® Winch/Depth Meter would work well (No. 85-E20). You may also want to use one with the standard & tall Ekmans. The standard can weigh over 30lbs (15kg) and the tall can weigh over 40lbs (20kg).*

The Ekman grab is messenger operated using the same trip mechanism as the Wildco water bottles. A Messenger is a bullet shaped piece of stainless steel that threads onto the line which is used to lower the grab. When the messenger is released, it slides down the line, striking a button on the top of the sampler. This button in turn releases the scoops, which will then snap shut.

To attach a line to the Ekman:

- Pass a line through the center hole of the stainless steel strike pad of the Twin-Pin™ release mechanism.
- Tie a large knot or fasten a knot to a suitable washer to keep the line from pulling back through the center hole.
- After tying the knot, make sure the scoops open and close securely.

After setting up the line, secure the other end of it to a fixed part of the boat. This way, if the sampler is inadvertently dropped it will not be lost. **Check knots frequently!!!**

In order to use the Ekman benthic grab properly, please follow these procedures:

- **Inspect the dredge to see that it is in good working condition.**
  - Thread the messenger on the line and attach the line securely to the dredge by passing the line through the trip mechanism and knotting it securely below the underlying plate.
  - Tie the opposite end of the line to a crane or boat.
- **Set the springs.**

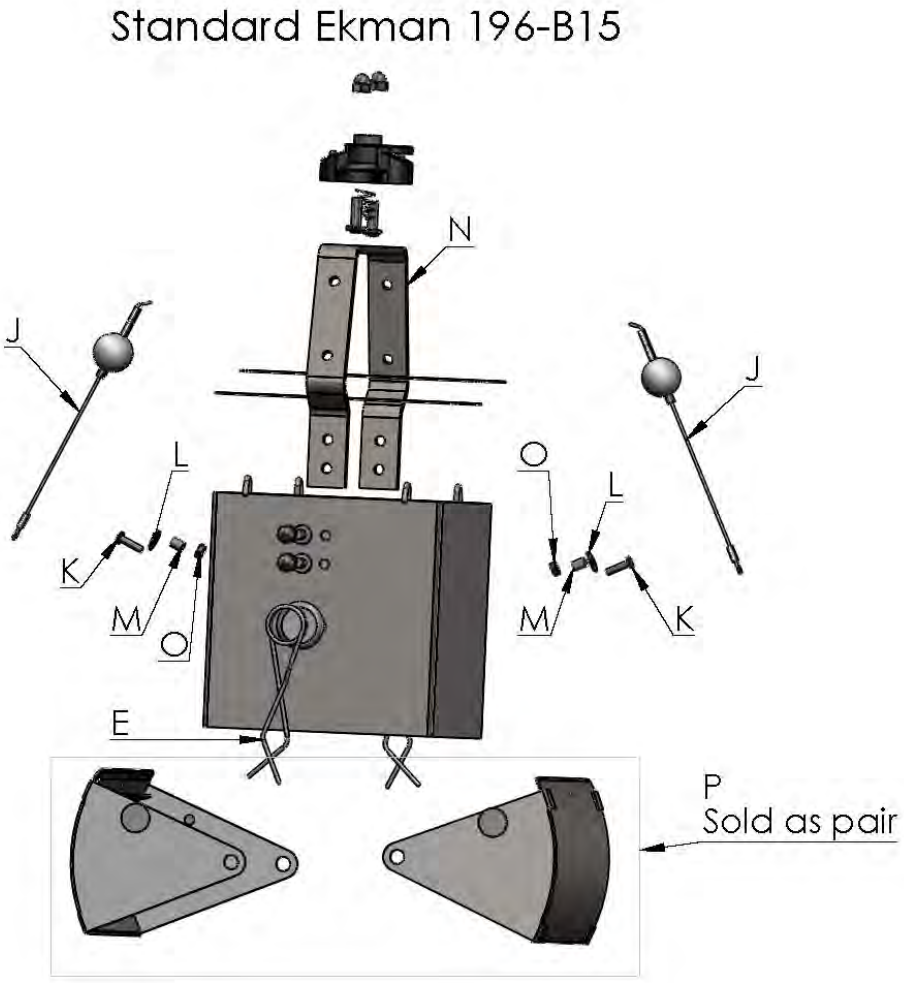
- When ready to sample, close the scoops and hook the end of one spring onto one scoop button. Carefully stretch the spring to reach the scoop button.
- Repeat with the second spring on the other side of the grab.

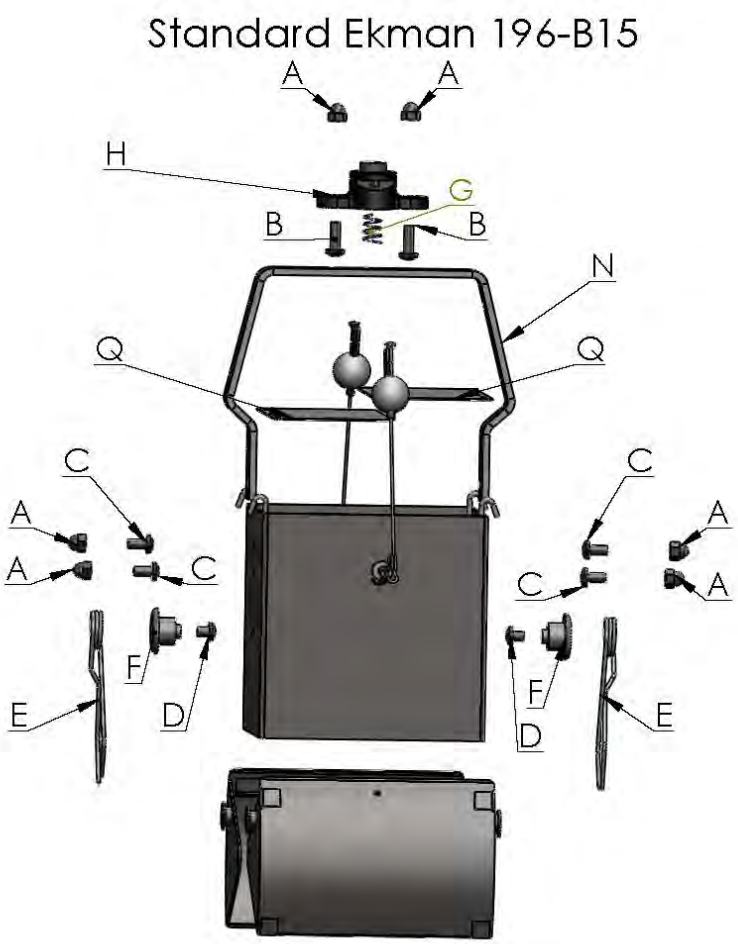
- **Arm the scoops**
  - Just before lowering the Ekman grab into the water, press down on the center of the trip mechanism and hook one cable loop to the inner pin.
  - Carefully release the button and hook the second cable loop to the outer pin.
  - Use the white ball on the cable for a hand grip.
- **Take the sample.**
  - Lower the sampler slowly so it will descend vertically. If it is dropped rapidly, it may tend to descend in a more diagonal direction due to water flowing past the surfaces of the grab.
  - When the line goes slack, the Ekman has reached the bottom. Allow the dredge to settle.
  - Holding the line with just enough tension to keep it straight, allow the messenger to slide down the line. The impact of the messenger will depress the top of the trip mechanism. This will release the cables and allow the springs to close the scoops.
- **Retrieve the sample.**
  - Lift the dredge to the surface with moderate, steady speed.
  - Deposit the sample into a container or sieve (such as the **188-E50 Wash Frame** or the **190-E25 Wash Bucket**) by pulling up on the cables one at a time.
  - Save the sample in a labeled plastic bag or jar for later analysis, or use a sieve to rinse the sample with fresh water before storing.
  - After completing the sampling session, unhook the springs for safety.
- **Sampling Tips.**
  - Leakage through the jaws can be caused by grit lodged between the side pieces of the jaws and the wall of the dredge body. Thoroughly cleaning the sampler before each use can help reduce this problem.
  - It is generally a good idea to discard samples where a hard object is caught between the jaws, causing leakage. If this is a common problem at your sampling site, you may need a heavier sampler such as the PONAR® Dredge,
  - The samples may be screened on board boats at the time of sampling, but could result in less accuracy, especially when the water is rough. It may be more convenient and accurate to wash the samples on land using fresh water at an outdoor tap rather than lake water.
  - Sub-sampling can easily be done by keeping the scoops closed and opening the top lids. Clear plastic tubes are often used to take sub-samples by pushing them into the sample.
  - Take an extra messenger and set of cables with you.

Maintaining your Ekman Sampler: Inspect the instrument carefully before each use. Carefully inspect all moving parts for cleanliness and ease of movement. Clean and adjust as necessary. Replace or repair damaged parts. Make sure the line is a single piece and is not frayed, as this could interfere with the messenger. After each sampling session, the Ekman should be rinsed thoroughly with fresh water and allowed to air dry completely before storing. Failing to do so can cause rust or a build up of scale. Avoid impacts with the survey vessel and other objects. This is a common problem in rough water.

Parts and Accessories:

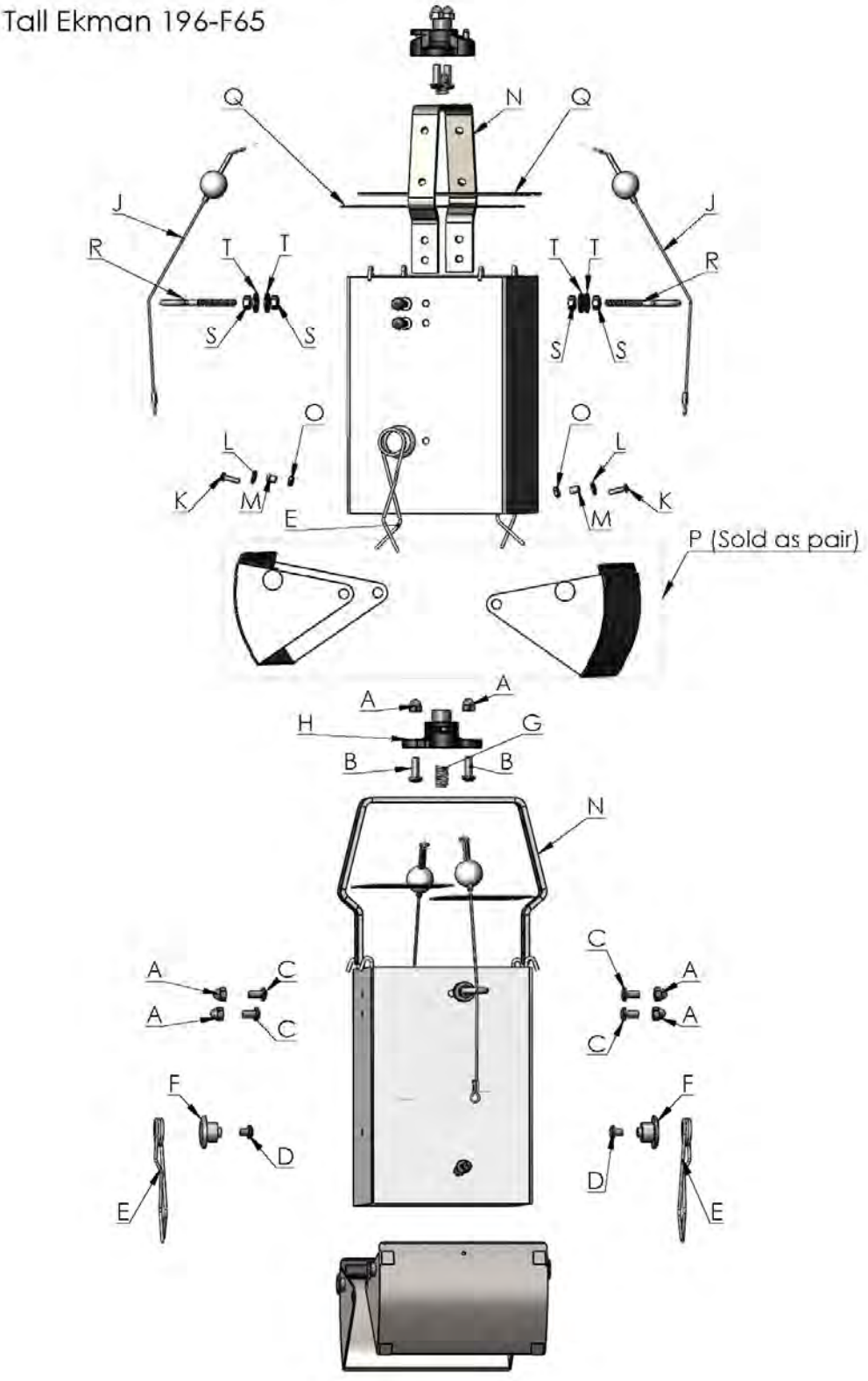
- **Messengers** *We recommend 45-B10 11 oz. split messenger*
- **Line** 100 feet, *62-C15*





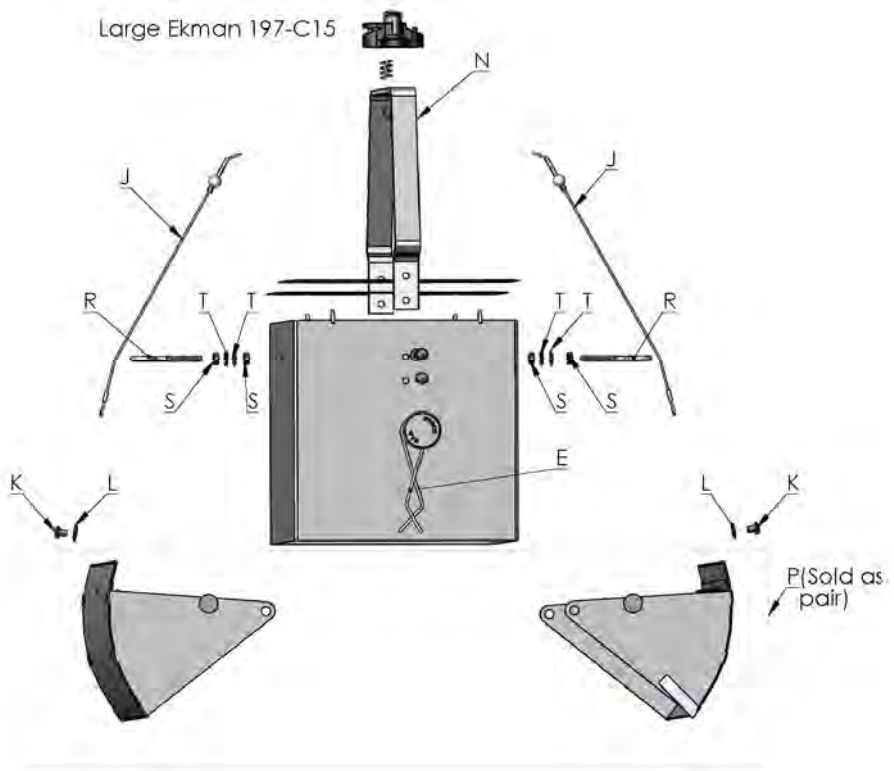
Standard Ekman 196-B15

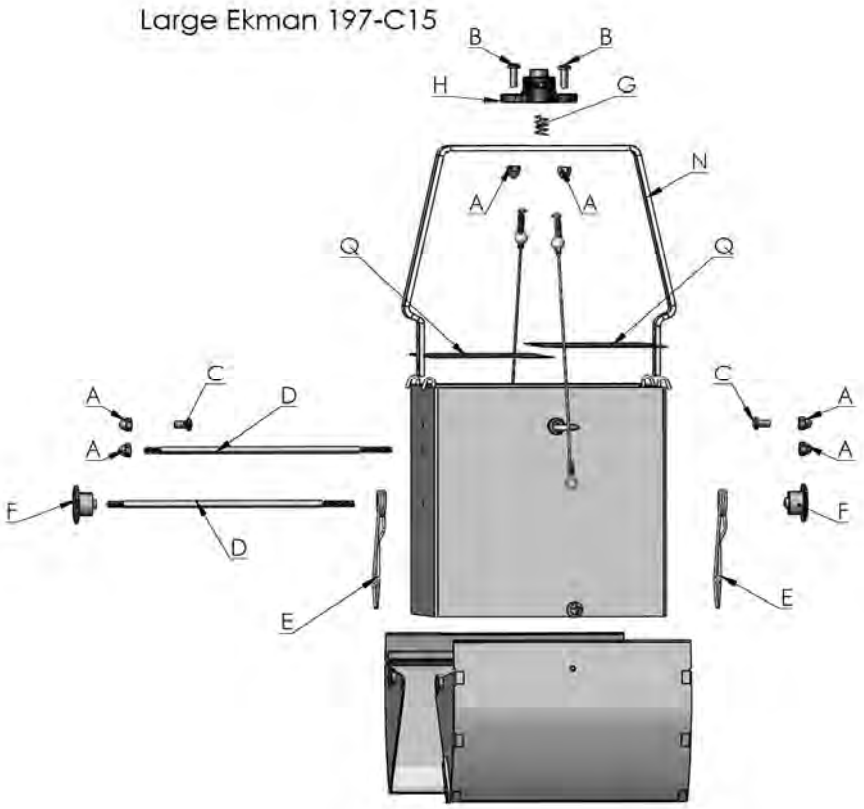
	Description	Part Number
A	Acorn nut 1/4"-20 stainless steel	010530
B	Machine screw 1/4"-20 x .75 SS	013990
C	Machine screw 1/4-20 x .50 SS	014005
D	Machine screw 1/4"-20 x .312 SS	014015
E	Spring, closing stainless steel	197-B15 (pack of 2)
F	Spring retainer cast SS	196-L25 (pack of 2)
G	Spring .475 x .75 x .032 SS	015520
H	Trip head repl kit Ekman	196-L11 (screws nuts spring incl)
J	Cables Ekman std 2 pack	196-F35
K	Machine screw 8-32 x .625 SS	013905
L	Washer flat #10 x 7/16	20-3416
M	Spacer 1/4" OD #8 hole	034606
N	Bail stainless steel	196-L22 (bail w screws & nuts)
O	Machine nut 8-32 stainless steel	20-2306
P	Scoops Ekman 1 pair	196-L15
Q	Lid (sold as pair	196-L20



Tall Ekman 196-F65

	Description	Part Number
A	Acorn nut 1/4"-20 stainless steel	010530
B	Machine screw 1/4"-20 x .75 SS	013990
C	Machine screw 1/4-20 x .50 SS	014005
D	Machine screw 1/4"-20 x .312 SS	014015
E	Spring, closing stainless steel	197-B15 (pack of 2)
F	Spring retainer cast SS	196-L25 (pack of 2)
G	Spring .475 x .75 x .032 SS	015520
H	Trip head repl kit Ekman	196-L11 (screws nuts spring incl)
J	Cables Ekman std 2 pack	196-F35
K	Machine screw 8-32 x .625 SS	013905
L	Washer flat #10 x 7/16	20-3416
M	Spacer 1/4" OD #8 hole	034606
N	Bail stainless steel	196-L22 (bail w screws & nuts)
O	Machine nut 8-32 stainless steel	20-2306
P	Scoops Ekman 1 pair	196-L15
Q	Lid (sold as pair	196-L20
R	Eyebolt 1/4"-20 SS	001521
S	Nut 1/4"-20 stainless steel	010620
T	Flat washer 1/4" stainless steel	017570





Large Ekman 197-C15

	Description	Part Number
A	Acorn nut 1/4"-20 stainless steel	010530
B	Machine screw 1/4"-20 x .75 ss	013990
C	Machine screw 1/4"-20 x .50 ss	014005
D	Shaft 1/4" x 9.75 threaded ends ss	014525
E	Spring, closing stainless steel	197-B15 (pack of 2)
F	Spring retainer cast ss	196-L25 (pack of 2)
G	Spring .475 x .75 x .032 ss	015520
H	Trip head repl kit Ekman	196-L11 (screws nuts spring incl)
J	Cables Ekman large 2 pack	197-G25
K	Machine screw 1/4" -20 x .31 ss	014015
L	Flat washer 1/4" ss	017570
N	Bail ss	197-L22 (bail with screws & nuts)
P	Scoops large Ekman 1 pair	197-L15
Q	Lid (sold as pair)	197-L20
R	Eyebolt 1/4" -20 ss	001521
S	Nut 1/4" -20 stainless steel	010620
T	Flat washer 1/4" stainless steel	017570

Petite Ponar 1728-G30 and 1728-G40: This instrument has become a mainstay of environmental studies. Combining the light weight of the Ekman with the robustness and capabilities of the Ponar, the Petite Ponar is an extremely versatile instrument. Wildco owns the patents and trademarks on the unit.

The Petite Ponar works well in most bottom conditions, except the hardest clays. If your unit is entirely stainless steel (1728-G30), it will function in fresh, brackish, or salty water. It can work in firm bottoms, such as sand, gravel, consolidated marl, and soft clay. Alternatively, it also samples nicely in muck, mud, and ooze. This instrument works best in areas that are free from vegetation.

If trace metals or organic sampling is to be conducted, Petite Ponars can be Teflon coated to prevent contamination of your sample. Please call for details.

<u>In order to sample most effectively, we recommend assembling the following equipment prior to going out:</u>

- Petite Ponar Sampler
- **Line** *We suggest 3/16-inch line such as Wildco® No. 62-C15.*
- **Sieve or Screen** *A 500 micron mesh screen is most commonly recommended for benthic invertebrate sampling. The Wildco® Wash Frame (No. 188-E50) would work well with the Petite Ponar. The Wildco® Wash Bucket (No. 190-E25) can be used with the petite Ponar, but not the full sized Ponar.*
- **Large-size tubs or other containers are often helpful**

- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*
- **Light-duty crane or winch** *The Petite Ponar can weigh over 30 pounds when full. The Wildco® Winch/Depth Meter would work well (No. 85-E20). You may also want to use one with other grabs as well.*
- **Weights** *such as 1726-G52 help the Petite Ponar sink deeper into the bottom, enabling a larger sample volume to be obtained.*

For Safety, please follow these guidelines:

- Be sure to keep the boat in proper balance at all times.
- Using the Petite Ponar grab and washing those contents may require leaning over the side of the boat.
- **Keep your balance!**
- Personal injury can be caused by the closing of the sharpened scoops.
- Although this is a "light" version of the standard Ponar, it still weighs 25 pounds and has sharp steel edges. It may cause injury if it is dropped on an appendage.

To operate the Petite Ponar, pleas follow these directions:

- Inspect the sampler to ensure all parts are in good working condition and that the unit is securely fastened to the boat or to the line on the hoist.
- 2. **WARNING:** Do not handle or move the Ponar® grab unless the safety pin is fully pushed in the locking holes.
    - *To insert the Safety Pin lock: Keeping clear of the jaws and other working edges of the grab, move the jaws to the open position. Bring the free end of the horizontal locking bar into position in the locking notch on the upper bar to insert the Safety Pin lock.*
- 2. **Attach your line.** We recommend use of Wildco® 's 62 series 3/16" braided polyester line. Loop your line through the clevis at the top center of the lever arms and **tie securely!** Secure knots are essential for operator safety and to prevent losing the sampler. We recommend using a bowline knot due to its incredible strength under strain.
- **Secure the other end of your line to your boat or float.** To prevent loss of the sampler, attach the free end of the line securely to boat or float for easy recovery.
- **Insert the Pinch-Pin™.** When fully ready to deploy the sampler, set it on the ground (or floor of the boat), remove the safety pin and insert the spring loaded Pinch-Pin in its place. While holding the Pinch-Pin in place, pull up on the rope to lock it in place. As long as the line is taut the Pinch-Pin will stay in place. When the line goes slack, the Pinch-Pin will pop out of the lever arm holes, allowing the scoops to close. The Pinch-Pin is secured to one of the lever arms by a chain to prevent getting lost.
- **Lower the sampler slowly.** If the sampler hits the top of the water too hard, the Pinch-Pin may pop out prematurely. The top surfaces of the Ponar are covered with 500 micron mesh stainless steel screen to reduce shock wave and drift and

prevent bottom sediments and organisms from escaping. When the line slackens, indicating that the proper depth has been acquired, the pinch-pin will pop out, and the sample is ready to be taken.

- **Take the sample.** When the grab reaches the bottom, allow a moment for it to sink into the sediments, and then slack off on the cable. Letting the line go slack serves to release tension on the upper bars and allows the Pinch-Pin to pop from the hole. When the tension on the cable is once again exerted, the scoops of the grab will close. This mechanical action, plus the force exerted downward by the weights bolted to the jaws, will force the jaws deeper into the bottom as they are moving to close. The jaws machine tapered cutting edges add to the ease of movement through bottom materials.
- **Maintain tension on the line** by slowly and steadily pulling on the line to close the sampler and raise the apparatus back to the surface. This should be a steady, relatively slow lift. Jerking the line to lift the sampler more quickly can cause the jaws to open slightly allowing sample to escape. *Closing should occur over 90% of the time.* If it does not, inspect all moving parts for cleanliness and ease of movement. Clean and adjust as necessary.
- **Remove the sample.** When the grab reaches the surface, lift it clear and swing it inboard to a position over a tub placed to receive the sample. The Petite Ponar® sample is designed for use with the Wildco® 190-E25 wash bucket. Either the Ponar® or Petite Ponar® grabs may be used with the Wildco® Wash Frame 188-E50. Rinse with clean water.
- Taking care to stay clear of the edges of the grab jaws, open the sampler and discharge the sample into the tub. Samples should be screened, sieved, separated, bottled, labeled and otherwise processed for analysis and classification studies by the standard procedures outline for the work in progress.
- If specimens are not analyzed at once, **place them in a labeled plastic bag** or jar for later study.
- At the end of sampling operations, replace the "Safety Pin" to prevent accidental closing of the grab jaws in handling or shipping. Then wash and inspect the grab and make necessary repairs or adjustments in preparation for the next use.
- *There are many other ways to process samples, depending upon the reason for taking it.*

Maintenance tips:

- Keep oiled or greased! Joints, such as the lever arms and the hinge, need to be kept well oiled in order to open and close properly. For best results use an **automotive** grade grease. If the sampling is for trace organics, contamination from hydrocarbons can be avoided by using Vaseline as a short term solution. Proper oiling also provides extra rust protection. If your sampler is going to be placed out of service for an extended period of time, apply oil to all surfaces to create a rust barrier.
- Daily cleaning: after each sampling session, rinse the sampler with distilled or fresh water. This will remove chemicals, salt, and other contaminants. Failing to do so may cause contaminants to set on the surfaces of your instrument, making

future cleaning difficult. Clean all components, including messengers and other related components. **Note: do not store samplers wet! This may cause rust, and mildew to form on the plastic parts.**

- Inspect the cutting edges for damage. Minor nicks and dents are okay, but severe flaws may interfere with sampling. In such cases, reworking the scoops may be required. Examine the joints to make sure the sampler closes smoothly. Oil as needed.
- **Removable top screens:** During your last washing, before storing your Ponar® grab, remove the two top screens and wash out any dirt or debris from the slots they slide in. You can adjust the tension of the top screen by increasing or decreasing its twist. Hold by the short sides, twist as needed.
- **Hard Water Scale:** After extensive sampling in hard water, calcium carbonate and other insoluble particles may build up. Remove these by soaking the entire sampler in a 3 N solution of nitric, sulfuric or hydrochloric acid. These solutions will remove the scale without damaging the metal or plastic parts. Limit the soaking time to 30 minutes. Rinse thoroughly. Check it carefully by eye. Repeat as necessary. *If needed, the side plates and under- lip can be removed, unscrewed, straightened by hammering and replaced.*

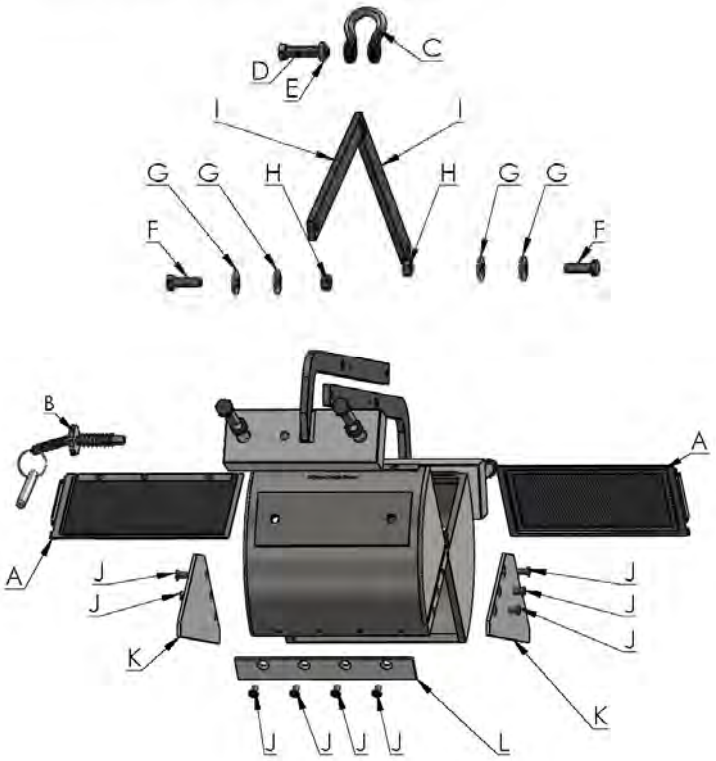
Replacement Parts:

- **Replacement Screens** pack of 2, *1728-G36*

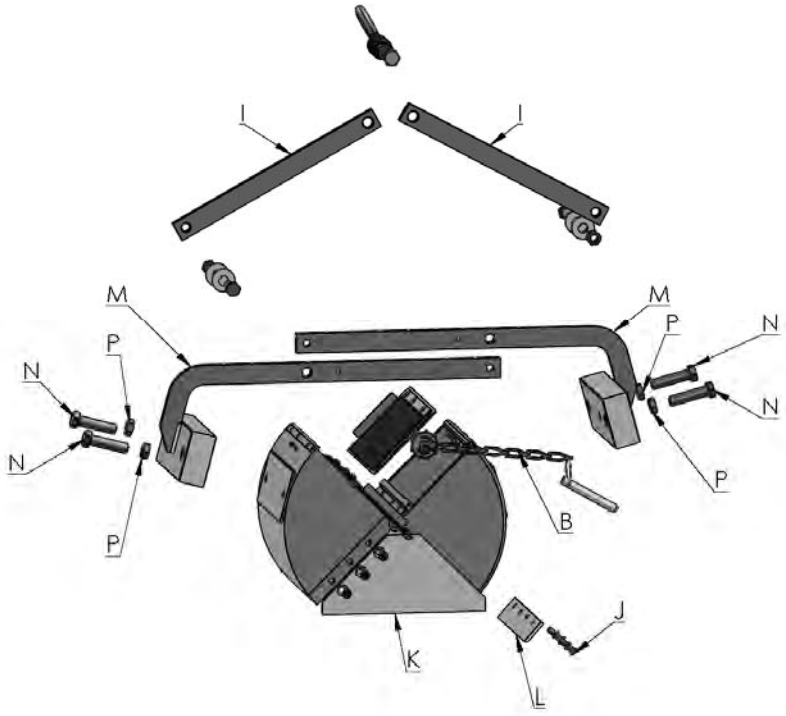
- **Weights,** pack of 2, *1726-G12 (Galvanized)* *1726-G52 (Stainless Steel)*

- **Pinch Pin** with chain and safety pin *1728-L12*

Petite Ponar 1728-G30 / 1728-G40

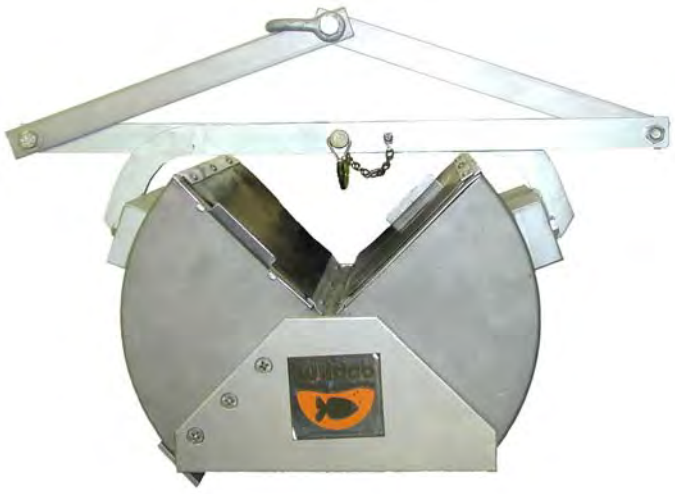


Petite Ponar 1728-G30 / 1728-G40



Petite Ponar 1728-G30 / 1728-G40

	Description	Part number 1725-G30	Part number 1725-G40
A	Screen assembly (sold as pair)	1728-G36	1728-G36
B	Replacement release pin	1728-L12	1728-L12
C	Shackle 5/16"	004415	021027
D	5/16"-18 x 1.5 hex head bolt SS	013552	013552
E	5/16"-18 nut SS	010615	010615
F	5/16"-18 x 1" Hex head bolt SS	013555	013555
G	Flat washer SS .375 x .875 x .078	031128	031128
H	Hex nut 5/16"-18 SS	010615	010615
I	Upper arm SS 1/4" x 3/4" x 8-3/4"	031708	031708
J	Flat head screw 10-32 x .375 SS	013805	013805
K	Side plate 1/8" x 3" x 6.5" SS	011550	011550
L	Scoop blade 1/8" x 1" x 6.5" SS	001370	001370
M	Lever arm assembly with weight	053710	053725
N	3/8"-16 x 1.5 Hex head bolt SS	013034	013034
P	3/8"-16 jam nut SS	010675	010675



Standard Ponar® Grab 1725-F10 / 1725-F50: Twice the size and weight of the Petite Ponar, this grab is a hefty piece of equipment. While not as portable or convenient as its smaller cousin, the larger sample volume and heavier weight allow this grab to bite deeply into sediments. These properties give it a better grip in hard bottom environments,

such as clays and silts. The heavy weight also increases strength, making this an extremely robust instrument. Some Ponars have been used in the field for decades.

In order to sample most effectively, we recommend assembling the following equipment prior to going out:

- Ponar Sampler
- **Cable** *We suggest 1/8-inch stainless steel cable such as Wildco® No. 61-B14.*
- **Sieve or Screen** *A 500 micron mesh screen is most commonly recommended for benthic invertebrate sampling. The Wildco® Wash Frame (No. 188-E50) would work well with the Ponar. The Wildco® Wash Bucket (No. 190-E25) can be used with the petite Ponar, but not the full sized Ponar.*
- **Large-size tubs or other containers are often helpful**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*
- **Light-duty crane or winch** *The Ponar can weigh over 75 pounds when full. The Wildco® Winch/Depth Meter would work well (No. 85-E20). You may also want to use one with other grabs as well.*
- **Weights** *such as 1726-G52 help the Ponar sink deeper into the bottom, enabling a larger sample volume to be obtained.*

For Safety, please follow these guidelines:

- Be sure to keep the boat in proper balance at all times.
- Using the Ponar grab and washing those contents may require leaning over the side of the boat. Ideally a winch should be used to lower the unit; be sure that the boat in counterbalanced against the winch and the fully loaded sampler.
- **Keep your balance!**
- Personal injury can be caused by the closing of the sharpened scoops.
- This instrument is composed of 50 pounds of steel, with sharp edges along the scoops. Take care to avoid dropping it on yourself or anyone else.

To Operate your Ponar Sampler, Please Follow these Guidelines:

- Inspect the sampler to ensure all parts are in good working condition and that the unit is securely fastened to the line on the hoist.
- **WARNING:** Do not handle or move the Ponar® grab unless the safety pin is fully pushed in the locking holes.
    - *To insert the Safety Pin lock: Keeping clear of the jaws and other working edges of the grab, move the jaws to the open position. Bring the*

free end of the horizontal locking bar into position in the locking notch on the upper bar to insert the Safety Pin lock.

- **Attach your line.** We recommend use of Wildco® 's 61-B series stainless steel cable. Loop your line through the clevis at the top center of the lever arms and **clamp securely!** Secure clamping is essential for operator safety and to prevent losing the sampler. **Clamp the other end of your line to your boat or float.** To prevent loss of the sampler, attach the free end of the line securely to boat or float for easy recovery.
- With the boat or working platform on location for the first sampling operation, use the winch to lift the grab clear of the deck and then the outboard. **Use a winch with the Standard Ponar.** Due to its weight (45 pounds) a winch such as Wildco® 's 66-C10 is generally used for heavier grabs. [Petite Ponar®, at 24 pounds, is usually hand-held.]
- **Insert the pinch pin™.** Just before lowering the grab into the water, and with the line taut, remove the safety pin so that the closing mechanism will release when the sampler is on the bottom. Firmly push the Pin-Pin in its place. As long as the line is taut the pinch-pin will stay in place. When the line starts to become slack, the pinch-pin spring will pop out of the lever arm holes, allowing the scoops to close.
- **Lower the sampler slowly.** If the sampler hits the top of the water too hard, the Pinch-Pin may pop out prematurely. The top surfaces of the Ponar are covered with 500 micron mesh stainless steel screen to reduce shock wave and drift and prevent bottom sediments and organisms from escaping. When the line slackens, indicating that the proper depth has been acquired, the pinch-pin will pop out, and the sample is ready to be taken.
- **Take the sample.** When the grab reaches the bottom, allow a moment for it to sink into the sediments, and then slack off on the cable. Letting the line go slack serves to release tension on the upper bars and allows the Pinch-Pin to pop from the hole. When the tension on the cable is once again exerted, the scoops of the grab will close. This mechanical action, plus the force exerted downward by the weights bolted to the jaws, will force the jaws deeper into the bottom as they are moving to close. The jaws machine tapered cutting edges add to the ease of movement through bottom materials.
- **Maintain tension on the line** by slowly and steadily pulling on the line to close the sampler and raise the apparatus back to the surface. This should be a steady, relatively slow lift. Jerking the line to lift the sampler more quickly can cause the jaws to open slightly allowing sample to escape. *Closing should occur over 90% of the time.* If it does not, inspect all moving parts for cleanliness and ease of movement. Clean and adjust as necessary.
- **Remove the sample.** When the grab reaches the surface, lift it clear and swing it inboard to a position over a tub placed to receive the sample. The Petite Ponar® sample is designed for use with the Wildco® 190-E25 wash bucket. Either the Ponar® or Petite Ponar® grabs may be used with the Wildco® Wash Frame 188-E50. Rinse with clean water.

- Taking care to stay clear of the edges of the grab jaws, open the sampler and discharge the sample into the tub. Samples should be screened, sieved, separated, bottled, labeled and otherwise processed for analysis and classification studies by the standard procedures outline for the work in progress.
- If specimens are not analyzed at once, **place them in a labeled plastic bag** or jar for later.
- At the end of sampling operations, replace the "Safety Pin" to prevent accidental closing of the grab jaws in handling or shipping. Then wash and inspect the grab and make necessary repairs or adjustments in preparation for the next use. *There are many other ways to process samples ,depending upon the reason for taking it.*

Maintenance Tips:

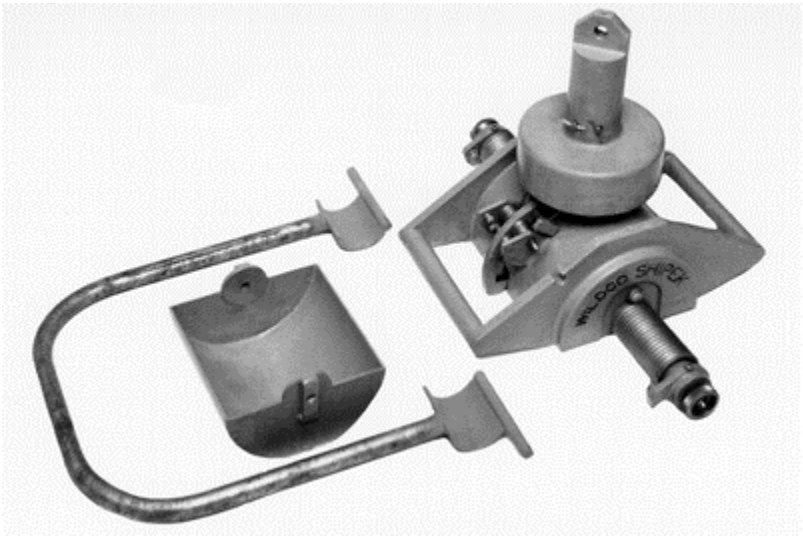
- **Keep lightly oiled and/or greased!** Lever arm pivots and the big hinge pin use an **automotive grade grease** or oil. Clean and adjust for smooth and easy motion.
  - *Tip: When the bottom grab is out of service for a prolonged length of time, we recommend applying a coat of oil or other rust barrier to protect the unit's metal surfaces. Coat all surfaces, joints, bolts and stud-bolt holes if these are to be left open.* **Note:** if you are doing organics sampling and do not wish to contaminate your sampler with hydrocarbons, petroleum jelly will work in the short term.
- **Daily Cleaning:** Thoroughly rinse with fresh water to remove any residue chemicals **after** each sampling session, with particular care after use in salt or acid water. Do the same with all equipment - cable, crane, winch, boats etc.
  - ***Never*** *store any aquatic sampling instrument while wet or damp. Always allow to air dry completely. Otherwise mildew or rust may form.*
- Wash the grab after each sample drop; at the close of the day, give the entire apparatus a thorough washing with fresh water. method or by distribution of individual samples along transects planned in advance.
- Inspect the cutting edges after each sample drop. Severe nicks or dents may require reworking these edges to assure a good cutting action and tight closure.
- **Removable top screens:** During your last washing, before storing your Ponar® grab, remove the two top screens and wash out any dirt or debris from the slots they slide in. You can adjust the tension of the top screen by increasing or decreasing its twist. Hold by the short sides, twist as needed.
- **Hard Water Scale:** After extensive sampling in hard water, calcium carbonate and other insoluble particles may build up. Remove these by soaking the entire sampler in a 3 N solution of nitric, sulfuric or hydrochloric acid. These solutions will remove the scale without damaging the metal or plastic parts. Limit soaking time to 30 minutes. Rinse thoroughly. Check it carefully by eye. Repeat as necessary. *If needed, the side plates and under-lip can be removed, unscrewed, straightened by hammering and replaced.*

Replacement Parts:

- **Replacement Screens** pack of 2,
  1725-K15

- **Weights,** pack of 2,
  1726-G12 (Galvanized)
  1726-G52 (Stainless Steel)

- **Pinch Pin** with chain and safety pin
  1728-L12



Shipek® Grab 860-A10: The Wildco Shipek sampler is our heaviest and most powerful. Functionally, it straddles the line between a spring driven and a weight driven sampler. When it strikes the bottom, its weight is the only thing that pushes it into the sediment. However, when activated, powerful springs cause the scoop to close, which easily cuts through even very hard bottoms.

The Shipek will work in unconsolidated sediments, from ooze to hard packed clay. Due to an all stainless steel design, it will function in salt water as well as fresh water. When it closes, an inner scoop rotates inside the outer scoop, forming a cylinder that is effective at trapping benthic organisms.

The body itself weighs about 85 pounds, and the trip weight reaches 48 pounds, for a total of over 130 pounds. For this reason, the Shipek **must be used by two strong adults**. In addition to the great weight, the closure springs are very strong and must be cocked by hand. If the scoop closes on a part of your body, it could cause serious injury or amputation. **Always treat the Shipek as though the scoop could slam shut any time!**

In order to sample most effectively, I recommend assembling the following equipment prior to going out:

- Shipek grab
- Stainless steel cable, such as Wildco number **61-B14**. *This 100ft length is strong enough to bear the great weight of the sampler.*
- A winch, such as **85-E10**. This *also functions as a depth meter.*
- While a winch may be adequate, I recommend also using a boat crane. **81-A10** will accommodate the Shipek grab and makes it much easier to use.
- **188-E50 wash frame** is useful for separating sediments.
- **Large-size tubs or other containers are often helpful**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*
- **An extra cocking wrench** such as 860-A35 is useful. If you lose your wrench while sampling, you will be unable to arm your Shipek.

For safety, please follow these guidelines:

- The Shipek is extremely heavy. **Always** have two strong adults managing the unit at all times.
- When armed, the powerful springs slam the scoop shut with great force, enough to crunch small pebbles that may be in the way. You may be severely injured if a part of your body is caught by the scoop when it closes. **Never arm the sampler unless you are ready to use it!**
- Hanging a heavy weight off the side of a boat inherently unbalances it. For this reason, **do not** use the Shipek in boats smaller than 22’ in length.
- Use the Shipek only when waves are low. When it is suspended over the side of a boat, the vessel is much more likely to capsize in heavy seas.

Operating your Shipek:

- **Inspect the dredge** to make sure it is in good working order. Check to make sure it is securely attached to the cable and winch/crane. If your sampler is not fully secured, you may lose it.
- **Carefully keeping clear of the jaws** and working edges of the dredge, move the scoop into the open position. To open the scoop, hold the corer by the lower bars and rotate the cocking arm until the trigger are (bucket latch) clicks into place and is fully engaged (about 180°).

- **Insert the J-hook safety pin at this time.** To do so, rotate the pin and slide it under the trigger arm.
- When you are ready to sample, remove the J safety pin.
- Use the winch/crane to lift the dredge clear of the boat deck and then outboard.
- Lower slowly into the water
- When the dredge reaches the bottom, allow a moment for it to sink into the sediments. **Keep tension on the cable** for penetration to occur.
- Now **winch the cable** to exert a closing motion, transmitted mechanically through the bars and to the jaws of the dredge.
- This mechanical action, plus the force exerted downward by the trip weights tends to force the scoop **deeper into the bottom** as it moves to close.
- **Maintain tension on the cable** by operating the winch. Sample cannot fall out once the scoop is triggered.
- When the instrument reaches the surface, lift clear and swing inboard over a tub placed to receive the sample, such as the **188-E50** wash frame.
- Taking care to stay clear of the edges of the jaws, open the unit and discharge the sample into the tub. The liner allows easy removal of the sample. You can pull the liner out with the sample contained within. Samples should be screened, sieved, separated, bottled, labeled, and otherwise processed for analysis and classification studies by the standard procedures outlined for the work in progress.
- At the end of sampling, **replace the safety pin** to prevent accidental closing of the jaws in handling or shipping. Then, wash and inspect the grab, and make the necessary adjustments or repair to prepare for the next sampling session. The unit should be decontaminated between each unique sampling location.

Maintaining your Shipek sampler: barring actual loss or severe damage due to accidents or abuse, this instrument will give many long years of service. Below are some tips on how you can extend the useful working life of your sampler.

- **Wash the dredge** after each sample drop, and thoroughly wash the unit after each sampling session. This is particularly essential after using the unit in salt water. The stainless steel construction resists corrosion, but it is not invincible. Leaving salt dried on the sampler will shorten its life. Do the same for all other equipment: cranes, winches, cables, etc.
- **Inspect the cutting edges** after each sample drop. Severe nicks or dents may require reworking these edges to assure a good cutting action and tight closure.
- **Keep greased!** Make sure the sampler is well greased but not over greased. Wipe of excess. For best results, use an automotive grease. One zerk fitting is on each end of the trigger arm axis. One zerk is on the end of each knob.
- **Lubricate** pivot points occasionally. When the bottom dredge is to be out of service for a long time, I recommend applying a coating of oil or other rust barrier to protect the metal surfaces. Coat all surfaces, joints, bolts and stud-bolt holes if these are to be left open.

To attach and remove the sample bucket: This section will likely need drawings

- Turn the sampler on its back or hang it by a cable.
- Pull knobs outward and give it a quarter turn
- Slide bucket into the guide-rails.
- Slide bucket until bucket holds and axial pins line up.
- Return knobs to closed position with pins reaching into the bucket sides. Bucket must be hanging outside the Shipek® body prior to winding.

Using the J hook safety pin:

- After winding and latching the instrument prior to sampling, engage the J-hook safety pin.
- Push the plate end of the J-hook from the recess hole in the trigger arm.
- Rotate the J-hook safety pin until the hook can go between the trigger arm and the main body of the sampler. Pull the J-hook by the plate end until fully between the two.
- Just before lowering the sampler overboard, remove the J-hook from between the sampler body and the trigger arm. Return the J-hook to its recess in the side of the trigger arm.
- Closing occurs when the J-hook safety pin is in the non-safety position and the trigger release drops on the trigger arm. The trigger arm then pivots, which unlatches the bucket and captures a sample.

Winding the torsion spring:

Winding the torsion spring for operation requires great care. Winding the large torsion spring by rotating the cocking jack can cause serious injury, unless done with great care and according to the instructions.

- Hang the sampler by its cable at a comfortable working height above the floor or deck.
- Rock the trigger arm. It must pivot freely. This means that the sampler is hanging properly by the trigger release weight.
- To wind the torsion springs:
    - Place the cocking jack on the torsion springs such that the curved plates cup over the torsion springs and the pins hook onto the torsion spring winding hooks.
    - Rotate the cocking jack about 180° or so until the trigger arm hooks over the edge of the bucket.
    - *Note: The torsion springs are wound one full turn before being locked into place by the two socket head cap screws on each torsion spring winding hook.*

This section will require extensive diagrams and possibly revisions.

Petersen Grab 1750-G30: This instrument is a time tested device, having been referenced in the related literature since 1930. It is designed to take samples in firm clay

bottoms free from vegetation, but with intermixtures of smaller pebbles, gravel, and other coarse debris. In softer bottoms it will dig down to the length of its scoops; for hard bottoms, like packed clay, it will dig as deep as most organisms can burrow. Its great weight allows this penetration; however, that same weight means you will want to use a winch to operate the device.

This grab is most commonly used where Petersen sampling data exists from 1930 or before. For obvious reasons, when doing comparisons you must take a new sample in the same fashion as the old one.

The Petersen is Wildco's only clamshell type sampler. It has no side plates or under-lip, and thus disturbs and distorts the soil sample. This is characteristic of the grab and one reason why it must be used for historical comparison.

The Petersen is made out of galvanized steel, which will work fine for fresh water, but is insufficient for salt water. The grab features a large sample area, tapered scoop edges, and a "safety pin" lock.

For the most effective sampling, I recommend you assemble the following items:

- Petersen Sampler
- **Cable** *We suggest 1/8-inch stainless steel cable such as Wildco® No. 61-B14.*
- **Sieve or Screen** *A 500 micron mesh screen is most commonly recommended for benthic invertebrate sampling. The Wildco® Wash Frame (No. 188-E50) would work well with the Ponar. The Wildco® Wash Bucket (No. 190-E25) can be used with the petite Ponar, but not the full sized Ponar.*
- **Large-size tubs or other containers are often helpful**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*
- Weights, such as **1751-G32**, will help the Petersen bite deeper into hard packed sediments.
- A winch, such as **85-E10**. This *also functions as a depth meter.*
- The **81-A10** crane works nicely as well.

To maximize your safety, please follow these guidelines:

- The Petersen extremely heavy. It weighs 75lbs when empty and 135lbs when full of sample. **Always** have two strong adults managing the unit at all times.
- Due to its weight, the scoops can close with considerable force. **Never** place a body part inside the unit if there is any chance of it closing! If you need to go inside to service the unit, place it on a table or bench first.
- Hanging a heavy weight off the side of a boat inherently unbalances it. For this reason, **do not** use the Petersen in boats smaller than 22' in length.

- Make sure you keep your balance while sampling, and counterweight your boat against the Petersen.

To operate your Petersen, Please follow these directions:

- Prepare the Sampler
  - Attach a strong line or stainless steel cable (recommended) by looping it through the clevis top center of the lever arms. Secure the line with a strong knot – or secure cable with a thimble and clamp – to prevent loosing the sampler. If you are using a line, I highly recommend using a bowline knot to secure it.
  - Attach the other end of the cable to the winch. Make sure that the winch mount or **81-A10** boat crane is securely fastened
- Before lowering the Petersen into the water, be sure the bayonet arm is in position and the cable or line is taut. Now unlatch and remove the safety pin. As long as the line is taut, the bayonet arm will stay in place. When the line becomes the least bit slack, the bayonet arm trip will slide out of its notch in the top lever arm, and the scoops will close.
- **Take the sample**. Lower the sampler to the desired sampling spot on the bottom. As the grab settles into the sediments, it slackens the line, allowing the bayonet arm to slip out of its notch. Pull the line or cable up. This causes the lever arms to drive the scoops into the bottom sediments, closing the scoops, and then lifting the dredge off the bottom.
- **Retrieve your sample**. After the scoops are closed, slowly and steadily draw the dredge upward. If you are using a winch this operation becomes much simpler. As long as there is tension on the line the sample will remain trapped.
- **Remove the sample.** Dump the contents of the unit into a sieve (188-E10 recommended) or other device to sift through the contents. Rinse reasonably clean with water. If you do not plan to analyze the specimen at once, I recommend placing it in a labeled plastic jar or bag for later study.
- *There are many other ways to process a sample, depending on the reasons for taking that sample.*

Maintaining your Petersen sampler:

- **Keep lightly oiled and/or greased!** Lever arm pivots use an **automotive grade grease** or oil. Clean and adjust for smooth and easy motion.
  - *Tip: When the bottom grab is out of service for a prolonged length of time, we recommend applying a coat of oil or other rust barrier to protect the unit's metal surfaces. Coat all surfaces, joints, bolts and stud-bolt holes if these are to be left open.* **Note:** if you are doing organics sampling and do not wish to contaminate your sampler with hydrocarbons, petroleum jelly will work in the short term.
- **Daily Cleaning:** Thoroughly rinse with fresh water to remove any residue chemicals **after** each sampling session, with particular care after use in salt or acid water. Do the same with all equipment - cable, crane, winch, boats etc.

- ***Never*** *store any aquatic sampling instrument while wet or damp. Always allow to air dry completely. Otherwise mildew or rust may form.*
- **Note:** the Petersen grab is **not** designed to be used in salt water! It is zinc plated steel, not stainless steel, and the useful life of the instrument will be decreased if it is used in a marine environment. If you must use this unit in salt water, apply a coating of protective paint first.

- Wash the grab after each sample drop; at the close of the day, give the entire apparatus a thorough washing with fresh water. method or by distribution of individual samples
  along transects planned in advance.
- Inspect the cutting edges after each sample drop. Severe nicks or dents may require reworking these edges to assure a good cutting action and tight closure.
- **Hard Water Scale:** After extensive sampling in hard water, calcium carbonate and other insoluble particles may build up. Remove these by soaking the entire sampler in a 3 N solution of nitric, sulfuric or hydrochloric acid. These solutions will remove the scale without damaging the metal or plastic parts. Limit soaking time to 30 minutes. Rinse thoroughly. Check it carefully by eye. Repeat as necessary.

Will need diagrams

Van Veen Grab 1775-A10: The Van Veen Grab is a time-tested sampling device that was first used in 1933. It can be used to retrieve sediment samples from deep water bodies with soft or sandy substrates. It is a relatively lightweight sampler that is useful for collecting the benthic macroinvertebrate organisms that inhabit the sediment. The top of the sampler has neoprene rubber flaps covering 500 micron mesh screens. The flaps open during deployment, thus reducing the frontal wave which could disturb the substrate. The flaps close over the screens when the sampler is retrieved. Quantitative studies can be performed on the collected sediment since the Van Veen will retrieve a sample of a given surface area of benthic substrate and the organisms within that substrate. Chemical and physical properties of the substrate are also often performed on samples collected using the Van Veen Grab. After sampling, the screens can be removed from the top of the grab for sub-sampling and easy cleaning. Extension arms are provided which can be attached to the arms on the unit when better leverage is needed. **Like Ponars®, the Van Veen can be Teflon coated for metal sampling.**

<u>Before sampling, I recommend assembling the following equipment:</u>

- Van Veen grab
- Stainless steel cable, such as Wildco number **61-B14**. *This 100ft length is strong enough to bear the great weight of the sampler.*
- A winch, such as **85-E10**. This *also functions as a depth meter.*
- While a winch may be adequate, I recommend also using a boat crane. **81-A10** will accommodate the Shipek grab and makes it much easier to use.
- **188-E50 wash frame** is useful for separating sediments.

- **Large-size tubs or other containers are often helpful**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*

To ensure safe operation of your Van Veen sampler, please follow these guidelines:

- Be sure you are able to keep the boat in proper balance at all times. The Van Veen Grab is heavy when full. Lowering, raising, dumping and washing contents may require leaning over the side of the boat. Keep your balance. Use a winch or crane, such as **81-A10**.
- Severe injury to hands or fingers can be caused by movement of the lever arms. Keep the safety pin fully latched in its position when the Van Veen Grab is not being deployed. Push the safety pin through both locking holes. Be very careful when the safety pin is not in place.
- Use a winch or crane! The Van Veen Grab weighs150 to 200 pounds when full (68 to 90kg). We strongly recommend use of a crane or winch along with a 22 foot or larger boat (7m).

To Operate your Van Veen sampler, please follow these instructions:

- WARNING: Do not handle or move the Van Veen Grab unless the safety pin is fully pushed into the locking holes. Keeping clear of the jaws and other working parts of the grab, move the jaws to the open position. Move the arms until the center holes are aligned. Insert the Safety Pin Lock.
- Inspect the sampler to ensure all parts are in good working condition. Check all nuts, bolts and other fasteners. Straighten out the chains (no kinks or twists).
- Attach the extension arms if more leverage is required.
- Attach strong line or stainless steel cable (recommended) by looping it through the clevis that connects the chains. Tie the line or clamp the cable securely. Clamp the other end of the cable securely to the winch or boat. Secure clamping is essential for operator safety and to prevent losing the sampler.
- Just before lowering the sampler into the water, and while the grab is resting on the deck, hold the line taut and remove the Safety Pin. Firmly push the Pinch-Pin in its place. The Pinch-Pin has a spring that will cause the pin to pop out when the line goes slack. Be very careful to keep pressure on the pin. This will keep the jaws open.
- Use the winch to lift the Van Veen clear of the boat and motor.
- Lower the sampler slowly. The 500 micron stainless steel screens help prevent drift and reduce the shock wave when the grab reaches the bottom. It also helps prevent bottom sediments and organisms from escaping.
- When the grab reaches the bottom (the cable will go slack), the Pinch-Pin will pop out. When you pull up on the cable, the arms will move upward, allowing the jaws to close. This motion tends to force the jaws deeper into the sediment as they close.

- Maintain tension on the cable by operating the winch, which will close the sampler and raise it back to the surface. We recommend a steady, relatively slow lift.
- When the Van Veen reaches the surface, lift it clear of the boat and swing it onboard over a tub or sieving device. As soon as the tension is released, the jaws can be opened manually to release the sample. Take care to avoid the working parts of the grab and the edges of the jaws. To take small sub-samples, keep the scoops closed and slide open the top screens. A common sub-sampling procedure is to push small diameter clear plastic tubes through the collected sample down to the jaws.
- Samples should be screened, sieved, separated, bottled, labeled and otherwise processed for analysis and classification by the standard operating procedures for the study. The Wildco Wash Frame is recommended for sieving the samples in the field. It has the same 500 micron mesh as the sampler, and is able to accept the weight of the full grab. It allows both the grab and the sample to be rinsed easily.
- At the end of sampling operations, reengage the Safety Pin to prevent accidental closing of the jaws in handling or shipping. Rinse the sampler with fresh water.

Maintenance: your Van Veen will last longer and perform better if it is properly maintained. To do so, a general list of tips is included below. If you need more information, please do not hesitate to call us.

- During sampling, rinse the Van Veen after each drop. Also inspect the cutting edges. Severe nicks or dents may require reworking these edges to assure good cutting action and tight closure.
- At the end of each sampling day, give the entire apparatus a thorough washing with fresh water to remove any sediment and residue chemicals. Use particular care after use in salt or acid water. Remove the two top screens and wash out any dirt or debris from the slots they slide in. You can adjust the tension of the top screens by increasing or decreasing the twist. Hold by the short sides, twist as needed.
- Rinse down all other equipment used during sampling – cable, crane, wash frame, winch, boat, etc. *Never store any aquatic sampling instrument while damp or wet. Always allow them to air dry completely. Otherwise rust or mildew may form.*
- Keep the moving parts lightly oiled and/or greased. An automotive grade grease or oil can be used on the lever arm pivots and big hinge pin. *When the sampler is out of service for a prolonged length of time, we recommend applying a coat of oil or other rust barrier to protect the unit's metal surfaces. Coat all surfaces, chains, joints, bolts and stud-bolt holes if these are to be left open*
- After extensive sampling in hard water, calcium carbonate and other insoluble particles may build up. Remove these by soaking the entire sampler in a 3 N solution of nitric, sulfuric or hydrochloric acid. These solutions will remove the scale without damaging the metal parts. Limit soaking time to 30 minutes. Rinse thoroughly. Check it carefully by eye. Repeat as necessary.

We'll need the usuals: accessories, diagrams, replacement parts, what have you.

Box Corer 191-A12: This patented Wildco® design is intended to take larger samples in harder bottoms more easily and safer than spring loaded designs. It functions best in finely divided muck, clays, mud, ooze, submerged marl, or fine peaty materials.

The sole driving force is the box corer's great weight, which can be increased by 96 pounds with up to twelve optional weights. The body itself is 31 pounds, and each weight weighs 8 pounds. These weights are securely fastened in two side bins, which are sold in sets of four to ensure good balance. This weight exerts enormous forces on the thin edges of the scoops, causing them to bite deeply into bottom sediments. Included with the unit is an acrylic liner which slips easily in and out, making it easy to remove your sample.

I recommend taking one or two trial samples before hand to determine whether you need more weights. You can experiment to determine if the dredge it biting deep enough into bottom sediments.

Before sampling, gather the following equipment for easier operation:

- Box Corer
- Stainless steel cable, such as Wildco number **61-B14**. *This 100ft length is strong enough to bear the great weight of the sampler.*
- A winch, such as **85-E10**. This *also functions as a depth meter.*
- While a winch may be adequate, I recommend also using a boat crane. **81-A10** will accommodate the Shipek grab and makes it much easier to use.
- **188-E50 wash frame** is useful for separating sediments.
- **Large-size tubs or other containers are often helpful**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*

Safety is of primary importance. Please read and follow these guidelines before sampling:

- The Box Corer is extremely heavy, even more so when full of sample. **Always** have two strong adults managing the unit at all times.
- Hanging a heavy weight off the side of a boat inherently unbalances it. For this reason, **do not** use the Box Corer in boats smaller than 22' in length.
- Use the instrument only when waves are low. When it is suspended over the side of a boat, the vessel is much more likely to capsize in heavy seas.
- Make sure the cable you are using is strong enough. If your cable were to snap under strain, it could whip around with great force, potentially causing injury.

To operate your box corer, please follow these directions:

- **Inspect** the dredge before using it to make sure it is in good working order. Make sure it is securely attached to the cable on the winch or crane.
- **Carefully** keeping clear of the jaws and other working edges of the unit, **move the scoops into the open position**. To open the scoops, hold the corer by the lower bar and push down on the top bar until the holes in the two bars are aligned.
- **Stack the included weights** in the side pockets on either side of the box corer. You need to make sure there are equal weights on each side, in order to balance the unit. To hold the weights in place, insert the locking pins through the hole on the side of the box and the weight itself. The large holes in the weights are used as finger grips for handling the weights. If you require additional weights, they can be ordered from Wildco®, catalog number **191-A91**.
- **Insert the safety pin at this time**. To do so, push the pin into the hole in the lower bar until it is completely through both bars.
- When you are ready to sample, remove the safety pin and replace it with the **pinch pin.**
- Pull up on the top bar to allow the weight of the sampler to hold the pinch pin in place. As long as there is tension on the arms, the pin will not fall out.
- Use a winch or crane to lift the dredge clear of the deck and then outboard.
- **Lower the dredge slowly** into the water. Top surfaces are covered with a 500 micron mesh screen to reduce shock waves and drift, yet prevents sediments and organisms from escaping. The screens allow the dredge to move smoothly through the water column.
- When the dredge reaches the bottom, allow a moment for it to sink into sediments. **Keep tension on the cable for penetration to occur.**
- **Slack off on the cable** to release tension on the upper bar. This permits the Pinch Pin to slide out, which allows the sampler to close.
- Now, **winch the cable** to exert a closing motion. This is transmitted mechanically through the bars into the jaws of the dredge.
- This mechanical action, in addition to the force exerted downward by the weights attached to the jaws, tends to force the scoops **deeper into the bottom** as they are moving to close. The machined tapered cutting edges on the jaws help cut smoothly through bottom sediments.
- **Maintain tension on the cable** by operating the winch. This completes the closing of the sampler and raises it back to the surface. This should be a slow, steady lift for best results.
- When the dredge reaches the surface, **lift it clear and swing it inboard** to position it over a tub placed to receive the sample. Our **188-E50** wash frame will work well.
- Taking care to keep clear of the jaws, **open the sampler and discharge the contents into the tub.** The liner allows easy removal of the sample. You can pull the liner out with the sample contained within. Samples should be screened, sieved, separated, bottled, labeled, and otherwise processed for analysis. If you do not plan to examine the specimens right away, put them in labeled jars for further study.

- At the conclusion of sampling operations, **replace the safety pin** to prevent accidental closing of the jaws in handling or shipping. Then, wash and inspect the grab. You may need to make repairs or adjustments in preparation for the next session.
- Decontaminate the unit between each sampling location to prevent cross-contamination.

Maintenance: If properly maintained, your Box Corer will last through many sampling seasons. Its stainless steel construction is highly durable and corrosion resistant.

- **Keep lightly oiled and/or greased!** Lever arm pivots use an **automotive grade grease** or oil. Clean and adjust for smooth and easy motion.
  - *Tip: When the bottom grab is out of service for a prolonged length of time, we recommend applying a coat of oil or other rust barrier to protect the unit's metal surfaces. Coat all surfaces, joints, bolts and stud-bolt holes if these are to be left open.* **Note:** if you are doing organics sampling and do not wish to contaminate your sampler with hydrocarbons, petroleum jelly will work in the short term.
- **Daily Cleaning:** Thoroughly rinse with fresh water to remove any residue chemicals **after** each sampling session, with particular care after use in salt or acid water. Do the same with all equipment - cable, crane, winch, boats etc.
  - ***Never*** *store any aquatic sampling instrument while wet or damp. Always allow to air dry completely. Otherwise mildew or rust may form.*
- Wash the grab after each sample drop; at the close of the day, give the entire apparatus a thorough washing with fresh water. method or by distribution of individual samples
  along transects planned in advance.
- Inspect the cutting edges after each sample drop. Severe nicks or dents may require reworking these edges to assure a good cutting action and tight closure.
- **Removable top screens:** During your last washing, before storing your Box Corer, remove the two top screens and wash out any dirt or debris from the slots they slide in. You can adjust the tension of the top screen by increasing or decreasing its twist. Hold by the short sides, twist as needed.
- **Hard Water Scale:** After extensive sampling in hard water, calcium carbonate and other insoluble particles may build up. Remove these by soaking the entire sampler in a 3 N solution of nitric, sulfuric or hydrochloric acid. These solutions will remove the scale without damaging the metal or plastic parts. Limit soaking time to 30 minutes. Rinse thoroughly. Check it carefully by eye. Repeat as necessary.

Wildco® Benthic Sleds:

While these are not grabs, they do sample along the bottom, mainly for organisms. They are lightweight, collapsible, and easy to use. They must be towed from a small boat in order to function. Unlike other benthic samplers, they sample an area of sediments, not just a single place. For this reason they are sometimes used to obtain composite samples.

Bottom sled, 171-D20 and 171-D30: this instrument looks a little like a sleigh. It consists of a net attached firmly to two stainless steel runners. These runners will sink partially into softer sediments, leaving the opening of the net just above the surface. This configuration is very useful for studying small organisms that dwell on the bottom, without disturbing burrowing creatures.

171-D20 uses 100 micron mesh. 171-D30 uses 243 micron mesh.

It is possible to obtain a version without runners to scrape bottom sediments. In addition, different net sizes, shapes, or materials can be ordered. Please call for details.

In order to sample effectively, you will want to gather the following equipment:

- Bottom Sled
- **Cable.** *We suggest 1/8-inch stainless steel cable such as Wildco® No. 61-B14.*
- **Large-size tubs or other containers are often helpful.**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens.** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87)*

Operating your Bottom Sled: The bottom sled is designed to be easy to use. It is lightweight portable, and because it is a net, does not need to be sieved later.

- You will need to perform some light assembly in order to use your bottom sled. For shipping, the U-shaped support ring is folded flat against the sled body. The ends of the U are threaded and have two nuts on each. **Remove these nuts.**
- Place the threaded ends of the U-frame through the corresponding holes on the L-shaped steel piece.
- Thread the nuts on the ends of the U-frame one after another. Tighten one until the frame is securely fastened to the L-shaped front piece. Tighten the second nut against the first to prevent it from working loose. **You can use a wrench to tighten the nuts, but do not over tighten.**
- Run your cable through the loop on the sled's cable assembly. Clamp it firmly, and secure the other end to your boat.
- Set the sled off the back of your boat gently. Give it time to sink to the bottom. You will know the sled has reached the bottom when the line goes slack.
- **Slowly** tow the sled. If you move too quickly, there will be enough resistance between the sled and the water to create lift, making the sled rise above the bottom.
- When you have sampled the desired area, draw in the sled. **It is better to pull it in swiftly.** This keeps enough water moving through the unit to prevent the sample from escaping.

Accessories, drawings, and the rest of the enchilada should probably be placed somewhere in this general area. Add net care/maintenance tips?

Biological Dredge 175-D40: The biological dredge is a benthic sampler similar to the bottom sled, but fulfills a slightly different purpose. Instead of catching organisms that live on bottom sediments, this instrument scrapes the bottom sediments themselves, pushing them into the net. In this way you can observe organisms and the material they live in at the same time. It is also good for larger organisms, such as shellfish, algae encrusted stones, and sponges.

In order to sample effectively, you will want to gather the following equipment:

- Biological dredge.
- **Cable.** *We suggest 1/8-inch stainless steel cable such as Wildco® No. 61-B14.*
- **Large-size tubs or other containers are often helpful.**
- **Forms or notebooks for sampling records** *You can purchase Rite in the Rain copy paper, note pads and pens from Wildco®.*
- **Wide-mouth sample bottles and marking pens.** *Wildco® has square, wide-mouth sample bottles that are less likely to roll around (No. 8900-E87).*

Operating your Biological Dredge: Operating your biological dredge is fairly easy. However, even in shallow water you will need to use a **power boat**.

- Unfold the tow arms from the main body. They are stored in this manner to simplify shipping.
- A chain should be attached between the tow arms, If it is not, it is very easy to pass the hooks through the holes in the ends of the tow arms.
- Connect a line or cable to the chain. It is best to form a loop in the line so that it can slide freely along the chain. This allows it to find the exact center of the chain during towing. **It is a good idea to attach a small rope from you main line to one of the tow arms, with plenty of slack. This acts as an emergency catch.**
- Secure the other end of your line to you boat. Double check the connection.
- Begin towing your dredge. Use a slow but even speed. Go too fast and the sled will tumble in the water.
- **If your sled snags**, do not be alarmed. You will feel such an event occur; immediately stop the boat. Our biological dredge features a “weak link”. This is at the end of the chain, and snaps much more easily than the chain or tow arm will. In this way, the rest of the unit remains unharmed.
- If this happens, slowly maneuver your boat until it is roughly above the sampler. You can then gently pull on the line until the unit works loose. This is why it is a good idea to run a **catch rope** from your main line to the tow arm. It gives you that extra margin of security.

Care, Cleaning and Storage:
At the end of each sampling session, remove all debris from the net. Rinse thoroughly with fresh water and allow to air dry completely before storing. Air-drying should be done in a darkened or shady area out of direct sunlight. There should be ample air movement. If you must travel before cleaning is possible, keep the net damp and free of debris. Rinse and air-dry it as soon as possible, preferably the same day. If stored wet, the net may mildew, which can damage the fabric. For mildew, use a mild hand detergent and a non-chlorine mildew remover for nylon. Rub gently as needed. When cleaning the net, keep the cable connectors away from the mesh to avoid damage. You can fasten them to the net ring with a strong safety pin to keep them out of the way. Algae, reeds, sedges, and other aquatic vegetation may cause "grass stains" on the net. Most detergents alone rarely remove grass stains or dried debris. A build-up of dried or fresh vegetation is best removed by sponging gently with ethyl alcohol or isopropyl alcohol. When the debris is removed, try rinsing with vinegar to remove any remaining stains. Spray & Wash® Trigger Spray may also help (make sure that it does not contain chlorine bleach). Avoid other brands since they may contain ingredients that are harmful to the nets. When sampling in hard water, calcium carbonate and other insoluble particles may build up and plug the apertures in the Nitex® netting. If this occurs, try soaking the net in a mild vinegar solution. Avoid commercially available products such as CLR® or Limeaway®, which may damage the net.

Wildco nets may be soaked in 10% chlorine bleach solution for five minutes and then rinsed immediately. Longer soaking times or stronger solutions of chlorine bleach may damage the nylon fabric. **We do not recommend using any other chemicals not mentioned above.**

After cleaning, rinse the net thoroughly and air-dry out of the sun

Warranty and Parts:
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.