MSC 134
Fishing Gear Technology II

Gill Nets: Concepts and Design
Gill Net Design: Class Example

We would like to construct a gill net **150 yards long**. We will be using a **#6 (#139) monofilament** webbing with a **1 ¾-inch mesh**. We would like to fish the net on the bottom (**sink net**) and would like the net to be approximately **7½ feet deep** when hung. The primary **hanging ratio should be 50%**. We will use a “Sponge” SB-2 **float** with **3/16-inch diameter hollow braided polypropylene rope**. The rope will have a buoyancy factor of approximately **0.02(0.0163) ounces per foot of rope**. We will also consider the “weight” of the webbing in our “design” calculations.

**How much webbing should we order?**

**How many meshes deep** should the webbing be?

**AND**

**How many pounds of webbing** do we need?
**MONOFILAMENT GILL NETTING**

(Also known as cat-gut, glass, or plastic)

Monofilament netting is made of a single clear strand of twine very similar to the line used on fishing reels. Our monofilament netting is designed specifically for strength, double knotted (so knots won't slip), and depth stretched (also to hold knots tighter and so the mesh will better conform to the shape of the fish). This netting is also clear in color, so it is especially effective in clear water and during daylight hours. Since it will not pick up as much trash or debris as multifilament netting can, fish can be picked out much more easily. This netting also does not soak up water as multifilament netting can, so it is lighter and easier to handle. Note: Monofilament gill netting is so effective that it is outlawed in some states; please contact your state fish and game department for laws governing your area.

**SPECIAL TREATMENTS:**

- **Tinted** - Choose from light green, dark green, light blue, dark blue, red, or brown. Add $1.26 per pound. (Min. charge for tinted netting is $125.00).

- **Pricing** - If ordering less than five pounds of a size, add 25%. Ask salesman about full-hank discounts.

**NOTE:** All depths are calculated on a half basis.
How many pounds of webbing will I need to complete this net? **7.2 Pounds**

\[
E_1 = \frac{L}{Lo}
\]

150 yd. Net x 3 ft. = 450 foot long Net

- 125 stretch feet per pound (Stk. #N221A)
- 125 str. ft.(Lo) x 0.50 (E_1) = 62.5 hung Ft./Lb. (L)
- 450 ft. net ÷ 62.5 hung Ft./Lb. = 7.2 Pounds

**NOTE:**
You must buy webbing either by “Hanks” or by the whole pound.
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How many pounds of webbing would you order?

- You can’t order partial poundage unless ordering a “hank”.
- The catalog presents a hank as the “standard” most people would base their gill net calculations with:
  - A 100 yard net hung on a “half” would require 4.8 pounds of stk. # N221A webbing.
    - $125 \text{ str.ft.}(\text{Lo}) \times 0.50 (\text{E1}) = 62.5 \text{ hung ft./lb.} (\text{L})$
    - $300 \text{ ft. net} \div 62.5 \text{ hung ft./lb.} = 4.8 \text{ Pounds}$
- But you need 7.2 pounds!

You should order: 8 Pounds
How many feet of repair material would you have left if you order 8 pounds of webbing?

\[
8 \text{ lbs.} - 7.2 \text{ lbs.} = 0.8 \text{ lbs. repair material}
\]

\[
0.8 \text{ lbs.} \times 62.5 \text{ hung ft./lb.} = 50 \text{ hung feet for repairs}
\]

What would the total cost of the webbing be (8 lbs)?

\[
\$70.80
\]

Catalog: 5 thru 24 Lbs. = $8.85 Lb.

Therefore,

\[
8 \text{ Lb.} \times $8.85 = $70.80
\]
Hanging the Net: “Pickups” & “Units”

“Pickup” = Distance allotted for consistent application of hanging ratios and maintenance of uniformity in the size of all meshes.

General Rules for “Pickups”

1. “Pickups” should always be between 2 and 8 inches
2. A “pickup” should never have more than 4 meshes
Hanging the Net: “Pickups” & “Units”

“Unit” = Distance between individual floats on the float line. Unit size will vary depending on the size of the individual “pickups”.

General Rules for “Units”

1. “Units” should never exceed 75% of the hung depth of net
2. Shallow nets (4 ft. to 10 ft.) should not exceed 50% of the hung depth of the net
3. There will be ONE float per unit & approximately 2 to 4 leads per unit.
When hanging the webbing to the headrope and footrope, **how many meshes** will you insert into every “pickup”?

When hanging the webbing to the headrope and footrope, what will the **distances** of your “pickups” be?

**KNOWN:**

1 mesh = 3.5” str.

\[ E_1 = 0.50 \text{ or } 50\% \]

\[ L = 0.50 \times 3.5” = 1.75” \text{ per mesh} \]

**Options:**

- 1 mesh = 1.75”
- 2 meshes = 3.5”
- 3 meshes = 5.25”
- 4 meshes = 7”

Refer to standards discussed in the handout “Entangling Nets, Gillnets & Seine Nets”
**Gill Net Schematic** = diagram showing a “one unit” section of the gill net that represents the distance and number of pickups between floats and the number of pickups between leads.

*You should complete the schematic in detail; all answers concerning floats and leads are based on the schematic.*
Calculate “Unit” size:

- This net is designed to be 7 ½’ (90”) deep.
- 50% of 90” = 45” which we have defined as the maximum distance between floats.

- $45” \div 7” = 6.42$ “pickups” between floats.
- We can’t have partial “pickups” so $6 \times 7” = 42”$ per unit

Option 1: 4 meshes @ 7 inches
Option 2: 3 meshes @ 5⅛ inches

Calculate “Unit” size:

- This net is designed to be 7½’ (90”) deep.
- 50% of 90” = 45” which we have defined as the maximum distance between floats.

\[
45” \div 5\frac{1}{4}” = 8.57 \text{ “pickups” between floats.}
\]

- We can’t have partial “pickups” so \(8 \times 5\frac{1}{4}” = 42”\)
Option 3 (Discretionary): 4 meshes @ 7 inches

Calculate “Unit” size:
- This net is designed to be 7½’ (90”) deep.
- 50% of 90” = 45” which we have defined as the maximum distance between floats.

- 45” ÷ 7” = 6.42 “pickups” between floats.
- We can’t have partial “pickups”
- 7 “pickups” at 7 inches each → 7 x 7” = 49 inches per “unit”

This schematic utilizes a “unit” that exceeds the “50% of hung depth” rule. However, it does not exceed the general rule of “75% of the hung depth” and thus becomes a discretionary decision and as such should have an attached explanation.
Gill Net Design: Class Example

We would like to construct a gill net 150 yards long. We will be using a #6 (#139) monofilament webbing with a 1¾-inch mesh. We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung. The primary hanging ratio should be 50%. We will use a “Sponge” SB-2 float with 3/16-inch diameter hollow braided polypropylene rope. The rope will have a buoyancy factor of approximately 0.02(0.0163) ounces per foot of rope. We will also consider the “weight” of the webbing in our “design” calculations.

How many floats will we need?
How many floats will you need to order?

Actual Floats Needed: 128  Floats Ordered: 130

**Option 1:** One float every 42” = 128.57 Floats (128 or 129 Floats)
[450’ (length of net) x 12” = 5400” ÷ 42”(units) = 128.57 floats]

**Option 2:** One float every 42” = 128.57 Floats (128 or 129 Floats)

**Option 3 (Discretionary):** One float every 49” = 110.2 Floats (110 or 111)
[450’ (length of net) x 12” = 5400” ÷ 49”(units) = 110.2 floats]

What is the total cost of those floats?

Total Cost: $41.60

[Catalog states 50 or more SB2 Floats = $ 0.32 each = 130 floats x $ 0.32 = ?]
Gill Net Design: Class Example

We would like to construct a gill net 150 yards long. We will be using a #6 (#139) monofilament webbing with a 1¾-inch mesh. We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung. The primary hanging ratio should be 50%. We will use a “Sponge” SB-2 float with 3/16-inch diameter hollow braided polypropylene rope. The rope will have a buoyancy factor of approximately 0.02(0.0163) ounces per foot of rope. We will also consider the “weight” of the webbing in our “design” calculations.

What is the floatation per unit for this net?
Air Weight, Buoyancy, & Ballast

- **Air Weight** = “heaviness” of the object out of water; *often given by the catalog*
- **Buoyancy** = tendency of an object to float; the amount of weight that can be held up in water; *usually needs to be calculated using density tables*
- **Ballast** = material added to increase tendency of an object to sink; the amount of weight necessary to overcome the buoyancy in water; *usually needs to be calculated using density tables*

**General Rules for buoyancy & ballast:**

1. Buoyancy and ballast calculations do not include weights of set anchors.
2. Buoyancy to ballast ratio is generally recommended as 1:2 to 1:2.5
   - In this area, a sink gillnet is rigged with *approx. ¾ ounce to 2 ounces* more ballast than buoyancy per unit, while a floating net should have *approx. ¾ ounce to 2 ounces* more buoyancy than ballast per unit.
3. Leads should be calculated at the rate of 2 to 4 leads per unit.
4. There will be only *one float per unit.*
Option 1: 4 meshes @ 7 inches

Floatation per “Unit” = 2.64 ounces

**Floats** = 2½ oz. (catalog for SB2 floats)

**Rope** = 0.02 oz. per ft. (approximate, given by scenario)
   0.0163 oz. per ft. (actual calculation)

One unit = 42” therefore 84”(7’) of rope per unit,
so 7’ x 0.02oz. = 0.14 oz. per unit (approx.)
   or 7’ x 0.0163oz. = 0.1141 oz. (actual)

**Floatation per “Unit”** =
2.5oz. (float) + 0.14oz. (rope, approx.) = 2.64 oz. (2.6141, actual)
**Option 1: 4 meshes @ 7 inches**

Floatation per “Unit” = 2.64 ounces

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How many leads will we need?
(How do we calculate necessary ballast fro this net?)
General Rules for Ballast:

1. We need to consider the weight of the webbing.
2. Sink gillnets are rigged with approx. \( \frac{3}{4} \) ounce to 2 oz. more ballast than buoyancy per unit.
3. Leads should be calculated at the rate of 2 to 4 leads per unit.

**KNOWN:** 2.64 oz. of buoyancy per unit

Therefore, necessary ballast:

- Minimum = (2.64 oz. of buoyancy + 0.75 oz.)
- Maximum = (2.64 oz. of buoyancy + 2 oz.)

- 3.39 oz. to 4.64 oz. of ballast per unit is necessary

We need enough weight per unit to reach this range of ballast.
Ballast: Webbing

- Ballast must consider the weight in water of the desired material.
- To obtain the weight in water, you must multiply the weight in air by the factor given in the “Density of Materials” table found in your “Ropes & Fibers” handout.
- Monofilament = Nylon or polyamides (PA); listed as a “Sinking Material”.

Webbing, Polyamide (PA) = 0.10+ (Multiplication factor in sea water)

This gillnet contains 62½ hung feet of webbing per pound (16 oz.).

So,

One “unit” on this net is 42” (3½’) which means:

\[\text{62½’ ÷ 3½’ = 17.857 units per pound of material.}\]

16 ounces ÷ 17.857 units = 0.896 oz. per unit of webbing.

Therefore,

\[0.896 \text{ oz.} \times 0.10+ = 0.0896 \text{ oz.}\]

of actual ballast per “unit” of webbing in seawater.
Remember:

- We want 3.39 oz. to 4.64 oz. of ballast per unit
- The webbing will add 0.0896 oz. of ballast per unit

So,

- 3.39 oz. – 0.0896 = 3.3004 oz.
- 4.64 oz. – 0.0896 = 4.5504 oz.

Therefore,

- 3.3004 oz. to 4.5504 oz. of ballast is still necessary
- We can get this by adding lead weights to the net
How many pounds of lead will you need? __________
How many leads per unit? __________

- Leads are designated by Hole diameter, Length, and Number of leads per pound.
- Diameter of the lead hole must be approximately 1/8” larger than rope diameter.

Catalog options that meet rope diameter criteria:

- Stk. LS6 (1/2”) = 6 Leads per Pound = 2.67 ounces each (16 oz. ÷ 6 = 2.6667)
- Stk. L8 (3/8”) = 8 Leads per Pound = 2 ounces each (16 oz. ÷ 8 = 2)
- Stk. L10 (7/16”) = 10 Leads per Pound = 1.6 ounces each (16 oz. ÷ 10 = 1.6)
- Stk. L13 (3/8”) = 13 Leads per Pound = 1.23 ounces each (16 oz. ÷ 13 = 1.2308)
- Stk. L16 (9/32”) = 16 Leads per Pound = 1 ounce each (16 oz. ÷ 16 = 1)
What size leads are you planning to use?  Stk. # __________

How many pounds of lead will you need? __________
How many leads per unit? __________

- Leads are designated by Hole diameter, Length, and Number of leads per pound.
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- Stk. L16 (9/32”) = 16 Leads per Pound = 1 ounce each (16 oz. ÷ 16 = 1)

Remember: 3.39 oz. to 4.64 oz. of ballast per unit is still necessary
Ballast: Lead Weights

- Ballast must consider the weight in water of the desired material.
- To obtain the weight in water, you must multiply the weight in air by the factor given in the “Density of Materials” table found in your “Ropes & Fibers” handout.
- Leads are listed as a “Sinking Material”.

**Lead = 0.91+ (Multiplication factor in sea water)**

Each #L8 lead has an air weight of 2 ounces (given in catalog).

So,

\[2.0 \text{ oz.} \times 0.91^+ = 1.82 \text{ oz. per lead of actual ballast in seawater}\]

And,

\[1.82 \text{ oz.} \times 2 = 3.64 \text{ oz. of ballast}\]
\[1.82 \text{ oz.} \times 3 = 5.46 \text{ oz. of ballast}\]
\[1.82 \text{ oz.} \times 4 = 7.28 \text{ oz. of ballast}\]

**Remember:** 3.39 oz. to 4.64 oz. of ballast per unit is still necessary.
Option 1: 4 meshes @ 7 inches (2 #L8’s)

Ballast per “Unit” = 3.73 oz. in seawater

Leads = 2 oz. each (catalog air weight)
1.82 oz. (actual weight in seawater)
Webbing = 0.896 oz. per “unit” (catalog air weight)
0.0896 oz. per “unit” (actual weight in seawater)

4 oz. (2 leads, air) + 0.896 oz. (webbing, air) = 4.896 oz. (Air Weight)
3.64 oz. (2 leads) + 0.0896 oz. (webbing, seawater) = 3.7296 oz. (Weight in seawater)

“The weight in water, with examples for materials and for a rigged gillnet” is shown in the Fisherman’s Workbook, Pg. 04.
Option 1: 4 meshes @ 7 inches (2 #L8’s)

What size lead are you planning to use?  Stk. #L8
How many leads per pound?  8

Leads are designated by Hole Diameter, Length and Number of Leads per Pound.
Diameter of the lead hole must be approximately 1/8” larger than rope diameter.
• Stk. L8 (3/8”) = 8 Leads per Pound = 2 ounces each (16 oz. ÷ 8 = 2)

How many leads per unit?  2

• The “handout” specifies a spacing of leads not to exceed 2 to 4 per float.
• A “sink gillnet” would need a minimum ¾ to 2 ounce ballast per unit.
• 2 #L8 Leads = 4 oz. (Air Weight)

How many pounds of lead will you need?  32.15

Number of Leads per unit  x  # of units in the net  ÷  # of leads per pound = Pounds
(2)  x  (5400” ÷ 42” = 128.6)  ÷  (8)

2 x 128.6 = 257.2 leads ÷ 8 leads per lb. = 32.15 Pounds
Option 1: 4 meshes @ 7 inches

Is this net designed to sink or float?  Sink

Original Specifications: “We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung.”

What is the average buoyancy per “unit”?  2.64 oz.

Floatation Calculations: 2.5oz. (float) + .14oz. (rope, approx.) = 2.64 oz.  
(2.6141 oz. actual)

What is the average ballast per “unit”?  3.73 oz.

Ballast Calculations: 3.64oz. (leads approx.) + .09oz. (webbing approx.) = 3.73 oz.  
(3.7296 actual in seawater)

What is the average “positive” (floats) or “negative” (sinks) factor you have calculated for each “unit”?  1.09 oz. “negative”

Calculation: Average ballast per unit – average buoyancy per unit.  
3.73 oz. – 2.64 oz. = 1.09 oz.
Other Design Options and Discretionary Decisions

For Student Review
(outside study material)
Option 1: 4 meshes @ 7 inches (2 #L10’s)

Floatation per “Unit” = 2.64 ounces
Ballast per “Unit” = 2.99 oz.

Leads = 1.6 oz. each (catalog)
   1.456 oz. (actual weight in seawater)
Webbing = 0.09 oz. per “unit” (approximate)
   0.089600 oz. Per “unit” (actual calculation)

2.9 oz. (leads approx.) + 0.09 oz. (webbing approx.) = 2.99 oz. (3.0016 actual in seawater)
Option 1: 4 meshes @ 7 inches (2 #L10’s)

Is this net designed to sink or float? __Sink__

Original Specifications: “We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung.”

What is the average buoyancy per “unit”? __2.64 oz.__

Floatation Calculations: 2.5oz. (float) + 0.14oz. (rope, approx.) = 2.64 oz. (2.6141 oz. actual)

What is the average ballast per “unit”? __2.99 oz.__

Ballast Calculations: 2.99oz. (leads approx.) + 0.09oz. (webbing approx.) = 2.99 oz. (3.0016 actual in seawater)

What is the average “positive” (floats) or “negative” (sinks) factor you have calculated for each “unit”? __0.35 oz. “negative”__

Calculation: Average ballast per unit – average buoyancy per unit. 2.99 oz. – 2.64 oz. = 0.35 oz.

Will this Design Work? __No – Not enough ballast!__
Option 1: 4 meshes @ 7 inches (3 #L13’s)

Floatation per “Unit” = 2.64 ounces
Ballast per “Unit” = 3.49 oz.
Leads = 1.2308 oz. each (catalog)
    1.12 oz. (actual weight in seawater) 3 x 1.12oz. = 3.36 oz. (3.4 oz.)
Webbing = 0.09 oz. per “unit” (approximate)
    0.089600 oz. Per“unit”(actual calculation)
3.4 oz. (leads approx.) + 0.09oz. (webbing approx.) = 3.49 oz. (3.4496 actual in seawater)
Option 1: 4 meshes @ 7 inches (3 #L13’s)

Is this net designed to sink or float?  __Sink__

Original Specifications: “We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung.”

What is the average buoyancy per “unit”? __2.64 oz__.

Floatation Calculations: **2.5oz.** (float) + **0.14oz.** (rope, approx.) = **2.64 oz.**
(2.6141 oz. actual)

What is the average ballast per “unit”? __3.49 oz__.

Ballast Calculations: **3.4 oz.** (leads approx.) + **0.09oz.** (webbing approx.) = **3.49 oz.**
(3.0016 actual in seawater)

What is the average “positive” (floats) or “negative” (sinks) factor you have calculated for each “unit”? __0.85 oz. “negative”__

Calculation: Average ballast per unit – average buoyancy per unit.
3.49 oz. – 2.64 oz. =0.85 oz.

Will this Design Work? **YES?? – Discretionary ballast!**
Option 2: 3 meshes @ 5¼ inches (2½ #L10’s)

Floatation per “Unit” = 2.64 ounces
Ballast per “Unit” = 3.69 oz.
Leads = 1.6 oz. each (catalog)
  1.456 oz. (actual weight in seawater) 2.5 x 1.456oz. = 3.64 oz. (3.6 oz.)
Webbing = 0.09 oz. per “unit” (approximate)
  0.089600 oz. Per “unit” (actual calculation)
3.6 oz. (leads approx.) + 0.09 oz. (webbing approx.) = 3.69 oz. (3.7296 actual in seawater)
Is this net designed to sink or float? _Sink_

Original Specifications: “We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung.”

What is the average buoyancy per “unit”? _2.64 oz._

Floatation Calculations: 2.5oz. (float) + 0.14oz. (rope, approx.) = 2.64 oz. (2.6141 oz. actual)

What is the average ballast per “unit”? _3.69 oz._

Ballast Calculations: 3.6 oz. (leads approx.) + 0.09oz. (webbing approx.) = 3.69 oz. (4.7296 actual in seawater)

What is the average “positive” (floats) or “negative” (sinks) factor you have calculated for each “unit”? _1.05 oz. “negative”_

Calculation: Average ballast per unit – average buoyancy per unit. 3.69 oz. – 2.64 oz. = 1.05 oz.

Will this Design Work? ______ YES! ______
Option 3 (Discretionary): 4 meshes @ 7 inches

Floatation per “Unit” = 2.66 ounces
Ballast per “Unit” = 4.6 oz.

Leads = 1.6 oz. each (catalog)
  1.456 oz. (actual weight in seawater)
Webbing = 0.10 oz. per “unit” (approximate)
  0.104439 oz. Per “unit” (actual calculation)

4.5 oz. (leads approx.) + 0.1 oz. (webbing approx.) = 4.6 oz. (4.4724 actual in seawater)

“Unit” Size? 49”
“Pickup” Size? 7”
Meshes per “Pickup”? 4
Floatation per “Unit”? 2.663 oz.
# of Leads per “Unit”? 3 (#L10)
Ballast per “Unit”? 4.6 oz.
Is this net designed to sink or float? **Sink**

Original Specifications: “We would like to fish the net on the bottom (sink net) and would like the net to be approximately 7½ feet deep when hung.”

What is the average buoyancy per “unit”? **2.66 oz.**

Floatation Calculations: 2.5oz. (float) + 0.164oz. (rope, approx.) = 2.664 oz. (2.63366 oz. actual)

What is the average ballast per “unit”? **4.6 oz.**

Ballast Calculations: 4.5oz. (leads approx.) + 0.10 oz. (webbing approx.) = 4.6 oz. (4.50166 actual in seawater)

What is the average “positive” (floats) or “negative” (sinks) factor you have calculated for each “unit”? **1.94 oz. “negative”**

Calculation: Average ballast per unit – average buoyancy per unit.
4.6 oz. – 2.66 oz. = 1.94 oz.

Will this Design Work? **Yes**
## Weight in Water – Overview of Options

<table>
<thead>
<tr>
<th>Option 1: 4 meshes @ 7” 42” unit,</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>2x #L8</strong></td>
<td><strong>2x #L10</strong></td>
<td><strong>3x #L13</strong></td>
<td><strong>2.5x #L8</strong></td>
</tr>
<tr>
<td>Rope &amp; Floats</td>
<td>Rope &amp; Floats</td>
<td>Rope &amp; Floats</td>
<td>Rope &amp; Floats</td>
</tr>
<tr>
<td>2.64 oz. / unit</td>
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<td>2.64 oz. / unit</td>
<td>2.64 oz. / unit</td>
</tr>
<tr>
<td>Leads &amp; Webbing</td>
<td>Leads &amp; Webbing</td>
<td>Leads &amp; Webbing</td>
<td>Leads &amp; Webbing</td>
</tr>
<tr>
<td>3.73 oz. / unit</td>
<td>2.99 oz. / unit</td>
<td>3.49 oz. / unit</td>
<td>4.69 oz. / unit</td>
</tr>
<tr>
<td>1.09 oz. Ballast/unit</td>
<td>.35 oz. Ballast/unit</td>
<td>.85 oz. Ballast/unit</td>
<td>2.05 oz. Ballast/unit</td>
</tr>
<tr>
<td>150 yard Gillnet 128.6 “units”</td>
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<td>150 yard Gillnet 128.6 “units”</td>
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</tr>
<tr>
<td>(not including anchors)</td>
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<td>(not including anchors)</td>
</tr>
</tbody>
</table>
## Weight in Water – Overview of Options

<table>
<thead>
<tr>
<th>Option 1:</th>
<th>Option 1:</th>
<th>Option 2:</th>
<th>Option 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 meshes @ 7”</td>
<td>4 meshes @ 7”</td>
<td>3 meshes @ 5.25”</td>
<td>Discretionary</td>
</tr>
<tr>
<td>42” unit</td>
<td>42” unit, 3x #L13</td>
<td>42” unit, 2½x #L10</td>
<td>49” unit, 3x #L10</td>
</tr>
<tr>
<td><strong>Rope &amp; Floats</strong></td>
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<td><strong>Rope &amp; Floats</strong></td>
</tr>
<tr>
<td>2.64 oz. / unit</td>
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<td>2.64 oz. / unit</td>
<td>2.66 oz. / unit</td>
</tr>
<tr>
<td><strong>Leads &amp; Webbing</strong></td>
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<td><strong>Leads &amp; Webbing</strong></td>
<td><strong>Leads &amp; Webbing</strong></td>
</tr>
<tr>
<td>3.73 oz. / unit</td>
<td>3.49 oz. / unit</td>
<td>3.69 oz. / unit</td>
<td>4.66 oz. / unit</td>
</tr>
<tr>
<td><strong>1.09 oz. Ballast/unit</strong></td>
<td><strong>.85 oz. Ballast/unit</strong></td>
<td><strong>1.05 oz. Ballast/unit</strong></td>
<td><strong>1.94 oz. Ballast/unit</strong></td>
</tr>
<tr>
<td><strong>150 yard Gillnet</strong></td>
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<td><strong>150 yard Gillnet</strong></td>
</tr>
<tr>
<td>128.6 “units”</td>
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<td>128.6 “units”</td>
<td>110.2 “units”</td>
</tr>
<tr>
<td><strong>29.97 lbs. Ballast</strong></td>
<td><strong>29.68 lbs. Ballast</strong></td>
<td><strong>32.15 lbs. Ballast</strong></td>
<td><strong>33.06 lbs. Ballast</strong></td>
</tr>
<tr>
<td>(not including anchors)</td>
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</tr>
</tbody>
</table>
Discretionary Decision Making

The average buoyancy and ballast values will change depending on local experience and gear applications. How do our net designs compare with examples given in our text and why might they differ?

<table>
<thead>
<tr>
<th>Option 1</th>
<th>4 meshes @7″,42″ unit, 2x #L8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buoyancy</td>
<td>21.22 lbs.</td>
</tr>
<tr>
<td>Ballast</td>
<td>29.97 lbs.</td>
</tr>
<tr>
<td>Ballast</td>
<td>8.75 lbs.</td>
</tr>
<tr>
<td>Ratio</td>
<td>1 to 1.41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 2</th>
<th>3 meshes @5.25″,42″ unit, 2½x L10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buoyancy</td>
<td>21.22 lbs.</td>
</tr>
<tr>
<td>Ballast</td>
<td>32.15 lbs.</td>
</tr>
<tr>
<td>Ballast</td>
<td>10.93 lbs.</td>
</tr>
<tr>
<td>Ratio</td>
<td>1 to 1.52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 3</th>
<th>4 meshes @ 7″ 49″ unit, 3x #L10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buoyancy</td>
<td>18.32 lbs.</td>
</tr>
<tr>
<td>Ballast</td>
<td>33.06 lbs.</td>
</tr>
<tr>
<td>Ballast</td>
<td>14.74 lbs.</td>
</tr>
<tr>
<td>Ratio</td>
<td>1 to 1.81</td>
</tr>
</tbody>
</table>

The text generally recommends a buoyancy to ballast ratio for a bottom set gillnet at approx. 1 to 2.

Rationale

The weights do not include anchors which add considerably to our overall weight and brings our ratios in line with the text.

Both our ballast and buoyancy values were based on sea water — we generally are working in brackish waters.

We generally use shorter length nets with smaller catches than commercial gear.

Our nets are generally used in shallow waters without excessive currents.

We can add ballast easier than subtracting ballast.

“Average buoyancy and ballast of gillnets and trammel nets” is shown in the Fisherman’s Workbook, Pg. 103.
Plan and rigging of a gillnet: example

**Gillnet**
bottom set for spider crabs
Brittany, France

**Vessel**
length 5–15 m
HP 15–20

\[ E_1 = \frac{L}{L_0} \]

\[ 0.50 = \frac{50}{100.16} \]

(320mm x 313)

**Pickups:** 2 meshes @ 320mm

**Units:** 1 Float @ 1600mm

(5 pickups x 320mm)

32 floats: \( \frac{50 \text{ M}}{1.6 \text{ M}} \) (31.25)

156 leads: \( \frac{50 \text{ M}}{0.32 \text{ M}} \) (156.25)

**Buoyancy:** 1600gf (floats only)

**Ballast:** 7098g (leads only—seawater weight)

5498 grams ballast (12.14 lbs.)

**Ratio 1 to 4.44**

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**This drawing shows the following information about the net:**

- **Stretched mesh size:** 320 mm
- **Length:** 313 meshes
- **Height:** 5½ meshes
- **Hanging ratio \( E \):** 0.50
- **Floats:** 32 plastic floats, each with buoyancy of 50 gf
- **Sinks:** 156 leads, each weighting 50 g
- **Twine:** material—polyamide; size—R 1666 tex
- **Floatline:** polypropylene/polyamide, diameter 6 mm, length 50 m
- **Leadline:** polypropylene/polyamide, diameter 6 mm, length 50 m

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For more details:
- Pages 29–30
- Pages 38–39
- Pages 47–49
- Pages 7–10
- Pages 7–8
- Pages 7–8