STONEFLIES
Order: Plecoptera

- Type of Metamorphosis: Aquatic Incomplete
- Stoneflies are typically found in cool, clean mountain streams. There are stonefly species that emerge year-round. There are large & small species that emerge in the heat of the summer and smaller species that emerge during the winter months. Stoneflies have the longest life cycle of any aquatic insects, taking up to four years for some nymphs to emerge into adults. Most females lay eggs over the water or swim down and lay egg masses on substrate.

- In the Northern Rockies, we have a larger population of winter and spring stones like Capniidae, Perlodidae, Chloroperlidae, with an abundance of the larger species, such as Perlidae & Pteronarcyidae, being found in highly oxygenated waters. Stoneflies are a great indicator of water quality, which is why the locally we have such dense populations with National Parks and clean waterways nearby.
Stonefly Ecology

Movement Groups

- **Clingers**: Have evolved flattened bodies in order to cling to rocks or other structures in rushing waters
- **Sprawlers**: Occupies habitat on top of fine sandy and silty sediment

Functional Feeding Groups

- **Shredder**: Shreds plant detritus, an important part of the ecosystem
- **Predator**: Hunts other invertebrates for food
Identifying Features

**Nymphs**
- Two tails
- Two tarsal claws on each leg
- Gills on thorax either present or absent
- Often elaborate patterning on thorax segments
- Obvious wing pads

**Adults**
- 2 sets of wings, some males *brachypterous*
- Wings folded flat on top of each other and flush to the body
- Two tails
- Long antenna
**Common Name(s):** Snowflies, Little Winter Stones

**Key ID Feature for Adults:** Mid tarsal segment shorter than basal segment, skinny, small and black, long cerci

**Key ID Features for Nymphs:** Abdominal segments are widest towards the bottom; hind wing pads are about as broad as they are long

**Ecology:** Clinger

**Feeding Group:** Predator

**Life Cycle:** Univoltine

**Immature Size:** ≤10mm

**Immature Color:** Caramel brown to dark brown

**Adult Size:** 4-10mm

**Adult Color:** Black, sometimes with dark brown legs

**Additional Info:** Highly sensitive to pollution

**Approximate Emergence:** December-March
**FAMILY: CHLOROPERLIDAE**

Common Name(s): Green Stoneflies, Spring Stones, Yellow Sallies  
Key ID Feature for Adults: Small size, usually very yellow/green in color  
Key ID Features for Nymphs: No distinct thorax markings, no gills  
Ecology: Clinger  
Feeding Group: Predator  
Life Cycle: Univoltine  
Immature Size: \( \leq 10 \text{mm} \)  
Immature Color: Varies from light caramel brown to yellow or tan  
Adult Size: 7-12mm  
Adult Color: Light green/yellow  
Additional Info: Very sensitive to pollution  
Approximate Emergence: July-August
Common Name(s): Little Black Stones, Winter Stones
Key ID Feature for Adults: X-pattern of crossveins on wings, small and blackish-grey in color, can’t see cerci past wings
Key ID Features for Nymphs: Filamentous, cervical (neck) gills (see top left photo); generally hairy body, rear wing pads divergent from thorax
Ecology: Clinger
Feeding Group: Shredder
Life Cycle: Multivoltine
Immature Size: ≤12mm
Immature Color: Dark Brown
Adult Size: 7-12mm
Adult Color: Black/Grey with mottled wings
Additional Info: Highly sensitive to pollution
Approximate Emergence: January-May
Common Name(s): Common Stonefly, GOLDEN STONES
Key ID Feature for Adults: Large size, often golden or brown in color
Key ID Features for Nymphs: Large gill tufts under arms and on thorax
Ecology: Clinger
Feeding Group: Predator
Life Cycle: Semivoltine, <1 per year; nymph life cycle can take up to 3 years
Immature Size: ≤38mm
Immature Color: Dark brown with light brown & yellow markings, white gills
Adult Size: ≤38mm
Adult Color: Brown or gold with lighter markings
Additional Info: Highly sensitive to pollution
Approximate Emergence: June-July
**FAMILY: PERLODIDAE**

**Common Name(s):** Springflies & Little Yellow Stones, Golden Stones

**Key ID Feature for Adults:** Similar to Perlidae, smaller in size, some with brachypterous wings (pictured on right)

**Key ID Features for Nymphs:** Lack of gills under appendages

**Ecology:** Clinger

**Feeding Group:** Predator

**Life Cycle:** Univoltine

**Immature Size:** ≤16mm

**Immature Color:** Dark brown with light brown & yellow markings

**Adult Size:** 7-16mm

**Adult Color:** Brown/Black/Yellow

**Additional Info:** Highly sensitive to pollution

**Approximate Emergence:** May-August
FAMILY: PTERONARCYIDAE

**Common Name(s):** Salmonfly

**Key ID Feature for Adults:** Enormous size, orange banding on neck portion

**Key ID Features for Nymphs:** Large, uniform dark color, large thoracic gills on ventral side (see middle photo)

**Ecology:** Clinger

**Feeding Group:** Shredder

**Life Cycle:** Semivoltine, 2-4 years

**Immature Size:** ≤50mm

**Immature Color:** Dark brown, almost black

**Adult Size:** 30-50mm

**Adult Color:** Dark brown to black with orange band at neck

**Additional Info:** Highly sensitive to pollution, females much larger than males, fly over open water and drop egg masses

**Approximate Emergence:** June-July
FAMILY: TAENIOPTERIGIDAE

Common Name(s): Willowflies, Winter Stones

Key ID Feature for Adults: 1\textsuperscript{st} and 2\textsuperscript{nd} tarsal segments of equal length, can’t see cerci past wings

Key ID Features for Nymphs: Wing pads not parallel with body, 1\textsuperscript{st} and 2\textsuperscript{nd} tarsal segments of equal length

Ecology: Clinger/Sprawler
Feeding Group: Shredder
Life Cycle: Univoltine
Immature Size: ≤14mm
Immature Color: Dark brown with lighter brown markings
Adult Size: 7-14mm
Adult Color: Black and grey, often mottled
Additional Info: Sensitive to pollution; Often confused with genus Zapada, distinguished by tarsal segments

Approximate Emergence: January-June