Riedel Supplemental Material 3.1 Glacial Lake Skymo deciduous plant and insect macrofossils per litre of sediment.

| **Taxon** | **NOCA 40 + 40B\***  **24.4 cal ka BP** | **NOCA 37**  **25.1 cal ka BP** | **NOCA 33**  **25.9 cal ka BP** |
| --- | --- | --- | --- |
| Bryophytes | | 46 fragments | 458 fragments | 74 fragments |
| Pinaceae | | 17 seeds,  15 seed wings,  29 cone scales | 29 seed wings, 29 seeds, 1 cone scale | 5 seed wing fragments, 2 half seeds, 11 twig terminals |
| *Abies* spp. | | 36 whole needles, 4163 needle tips and bases, 1 seed, 62 twig terminals | 136 whole needles, 1,395 tips and bases, 15 twig terminals | 11 twig terminals, uncounted needle fragments |
| *Picea* spp. | | 50 whole needles, 3,380 tips and bases, 53 twig terminals | 804 whole needles, 6,165 tips and bases, 110 twig terminals | uncounted needles,  69 twig terminals |
| *Pinus albicaulis* | | 1 whole needle,  44 needle fascicles,  451 needle tips and bases | 496 needle tips and bases,  94 needle fascicles | 83 needle fascicles, uncounted needles |
| *Salix* | | 1 persistent bud | -- | -- |
| *Betula* | | -- | 1 *Betula nana* type nutlet | 1 *Betula nana* type nutlet, 2 *Betula* sp. nutlets |
| *Potamogeton* spp. | | *P. vaginatus*: 37 achenes | *P. alpinus*: 6 achenes | -- |
| *Ranunculus aquatilis* | | 107 achenes | 20 achenes,  26 half achenes | 90 achenes,  158 half achenes |
| *Carex* sp.  lent. type | | 57 achenes | 226 achenes | 47 achenes |
| *Carex* sp.  trigonus type | | 54 seeds,  perigynium fragments | 23 achenes | 22 achenes |
| *Empetrum* *nigrum* | | -- | 1 nutlet | 4 nutlets |
|  | |  |  |  |
| Coleoptera | | 5 species,  29 body parts,  1 articulated | 7 species,  32 body parts,  4 articulated | 5 species,  16 body parts,  9 articulated |
| Diptera-  Chironomidae | | 176 larvae head capsules | 17 larvae head capsules | 199 larvae head capsules |
| Crustacea–  *Daphnia* sp. | | 383 ephippia | 122 ephippia | 463 ephippia |
| Hymenoptera | | 4 heads,  2 thorax fragments | -- | 4 thoracic fragments |
| Arachnida | | 5 mites, 1 spider thorax | 1 mite | 2 mites |
| Other animal | | 14 small mammal fecal pellets | 1 Lepidoptera mandible |  |

\* Double volume

Riedel Supplemental Material 3.2 Glacial Lake Concrete plant and insect macrofossils per liter sediment.

| **Macrofossil** | | | **Big Boy, NOCA 104**  **20.7 cal ka BP** | | | **Big Boy, NOCA 105**  **21.2 cal ka BP** | | | | **Big Boy, NOCA 100**  **23.5 cal ka BP** | | | **Big Boy, NOCA 101**  **22.7 cal ka BP** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unidentified | | | -- | | | -- | | | | 2 seeds | | | 8 seeds | | | | |
| Fungal sclerotia | | | 52 | | | 3 | | | | 157 | | | 2 | | | | |
| Bryophytes | | | many fragments of a few types | | | many fragments of a few types | | | | *Sphagnum* sp*.:* fragment | | | leaves and stem fragments, stem fragments | | | | |
| *Carex* lent. type | | | 33 achenes with partial perigynia,  22 achenes | | | type 1: 264 achenes with partial perigynia, 120 achenes without perigynia  type 2: 4 achenes with partial perigynia | | | | 32 achenes, 8 achenes with perigynia | | | 7 achenes with partial perigynia  Type 1: 135 achenes | | | | |
| *Carex* trigonous type | | | 1 achene | | | 3 achenes  *Eriophorum* sp.*:* 2 achenes | | | | -- | | | 1 achene | | | | |
| *Selaginella* sp*.* | | | -- | | | 1 megaspore | | | | *Selaginoides* (L.) Link: 43 megaspores | | | *Selaginoides* (L.) Link: 462 megaspores | | | | |
| Pinaceae | | | 431 medial needle fragments, 2 cone scales, 1 seed, 1 seed wing, 2 seed wing fragments | | | 3 medial needle fragments | | | | -- | | | 1 seed | | | | |
| *Abies* sp*.* | | | needles: 4 whole, 196 tips and bases, 7 terminal fragments | | | needles: 2 tips, 1 base | | | | 1 needle tip, 1 fragment, 1 twig terminal fragment | | | -- | | | | |
| *Picea* sp*.* | | | needles: 6 whole, 237 tips and bases, 11 twig terminal fragments | | | -- | | | | needles: 1 tip, 3 bases, 1 half, 6 fragments | | | needles: 1 tip, 1 base, 1 fragment | | | | |
| *Tsuga/Pseudotsuga* sp*.* | | | needles: 2 whole, 2 bases, 1 medial fragment | | | -- | | | | -- | | | -- | | | | |
| *Equisetum* sp*.* | | | ~11 stem fragments | | | ~67 stem fragments | | | | ~10 stem fragments | | | ~18 stem fragments | | | | |
| Juncaceae | | | *Juncus bufonius?:* ~3 seeds | | | *Juncus bufonius?:* ~10 seeds | | | | *Luzula* sp*.:* 26 seeds | | | ~20 seeds | | | | |
| *Salix* sp*.* | | | 2 seed capsules, 6 half capsules, ~68 buds, ~21 twigs with buds | | 4 seed capsules, 11 half capsules, ~52 buds, ~5 twigs with buds | | | | | 2 seed capsules, 3 buds | | | | 1 half seed capsule, 92 buds, 4 twigs with buds | |
| *Polygonum?* sp*.* | | | -- | | 1 achene | | | | | -- | | | | -- | |
| Rosaceae | | | *Rubus idaeus* L.: 1 half stone | | *Argentina anserine* (L.) Rydb.: 3 half achenes; *Potentilla* sp., 8 achenes | | | | | -- | | | | -- | |
| Betulaceae | | | *Alnus?* sp*.:* 1 seed | | -- | | | | | -- | | | | | -- | | | | |
| *Chenopodium* sp*.* | | | 4 seed fragments | | -- | | | | | -- | | | | | -- | | | | |
| Caryophyllaceae | | | 1 seed fragment | | -- | | | | | -- | | | | | -- | | | | |
| Brassicaceae | | | 2 seeds | | -- | | | | | -- | | | | | -- | | | | |
| Others | | | twig/wood fragments, ~30 deciduous leaf fragments, ~50 leaf blades, 4 bud scales, bark fragments | | ~20 bud scales, bark fragments, twig fragments, root fragments, 1 deciduous leaf fragment | | | | | root fragments, wood/twig fragments, 3 charcoal fragments, 2 deciduous leaf fragments | | | | | wood, twig, and bark fragments | | | | |
| Coleoptera (see Appendix 4-1) | | | 27 body parts | | 104 body parts | | | | | 17 body parts | | | | | 88 body parts | | | | |
| Diptera and  Tipulidae | | | 2 half pupae, 2 larval head capsules, 2 half head capsules | | 7 larval head capsules, 12 half head capsules | | | | | -- | | | | | 4 half pupae, 26 fragments, 1 half larval head capsule | | | | |
| Crustacea | | | -- | | -- | | | | | -- | | | | | 1 ephippium | | | | |
| Hymenoptera | | | 1 head, 2 thoracic fragments | | 4 heads, 2 thorax fragments | | | | | -- | | | | | 3 thoracic fragments | | | | |
| Arachnida | | 1 mite, 2 half mites, 1  chelicer spider | | 3.5 mites, 1 spider palp, 2 male cephalothoraces | | | 1 mite | | | 18 mites | | | | | |
| Other | | | ~34 small mammal fecal pellets; pupa: 2 whole, 2 half, 1 fragment | | | ~50 half pupa and fragments, 3 larval head capsules, 3 immature mandibles | 2 pupa fragments, 1 larval head capsule | | | | | 5 small mammal fecal pellets (star-shaped in cross-section), 1 pupa and 2 fragments, 5 half larval head capsules | | | |

**Riedel Supplemental Material 3.3. Conifer needle counts from the University of Washington. Counts include needle base and tip fragments. These numbers are divided by two and added to whole needle count in Figure 6.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Skagit Assemblage  (radiocarbon age) | Western hemlock / Douglas-fir | Sitka spruce | Mountain hemlock | Amabilis fir / Grand fir | Subalpine fir | Engelmann spruce | Total number/litre |
| **Glacial Lake Concrete** |  |  |  |  |  |  |  |
| 104 (20.7 cal ka BP) | 13 | 18 | - | 2 | 33 | 61 | 127 |
| 105 (21.2 cal ka BP) | - | - | - | 1 | 2 | - | 3 |
| 100 (23.5 cal ka BP) | - | 4 | - | - | 1 | 15 | 20 |
| 107 (23.9 cal ka BP) | - | - | - | 1 | 1 | - | 2 |
|  |  |  |  |  |  |  |  |
| **Glacial Lake Skymo** |  |  |  |  |  |  |  |
| 61/98 (21.8 cal ka BP) | 3 | - | 1 | 5 | 2 | 10 | 21 |
| 40 (24.4 cal ka BP) | 10 | 14 | 53 | 18 | 59 | 116 | 270 |
| 37 (25.1 cal ka BP) | - | 47 | - | 8 | 47 | 101 | 203 |
| 33/77 (25.9 cal ka BP) | 3 | 4 | 6 | - | 4 | 63 | 80 |
| 36 (25.5 cal ka BP) | - | - | - | 5 | - | 100 | 105 |
| 28/56 (27.7 cal ka BP) | 1 | - | 1 | - | - | 2 | 4 |