

**Northwest Donegal GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
Hydrometric Area 38 Donegal Co. Co.	<p><b>Rivers:</b> Abberachrin, Abroe, Aighe, Almore, Aspick, Bellanagoal, Bunlin, Burnside, Big Burn, Bracky, Calabber, Carnahorna, Carrownamaddy, Cathen, Clady, Cronaniv, Cloghernagore, Corveen, Croagheen, Cromore, Derryart, Devlin, Dunglow, Duntally, Duvoge, Dungloe, Duvowen Faymore, Glasnaseeragh, Glen, Glengesh, Glendlough, Glenna, Glenree, Glenreraragh, Glentornan, Gortnaleck, Gweebarra, Gweedore, Kildarragh, Lough Agher, Maas, Murlin, Owenaleck, Owenaltderry, Owenator, Owenawillin, Owenbeg, Owencarrow, Owencronahulla, Owencrovarra, Owenea, Owengarve, Owennamarve, Owenragreeve, Owenree, Owentocker, Owentully, Owenwee, Ray, Barra, Shanowen, Stracashel, Tullaghobegley, Yellow, Owenveagh, Shallogen, Sruhannameel, Stranagoppoge, Thllaghobegly.</p> <p><b>Streams:</b> Glenleheen, Port (3604 unnamed streams)</p> <p><b>Lakes:</b> c.550 lakes (see List 1 below)</p>	Fawnboy Bog/Lough Nacung, Gannivegil Bog, Horn Head and Rinclevan, Lough Nagreany Dunes, Lough Nillan Bog (Carrickatlieve), Slieve League, Slieve Tooley/Tormore Island/Loughros Beg Bay, Tranarossan and Melmore Lough, West of Ardara/ Maas Road, Ballyness Bay, Coolvoy Bog, Gweedore Bay and Islands, Muckish Mountain, Sheephaven, Meenaguse Scragh, Cloghernagore Bog and Glenveagh National Park and Rutland Island and sound (O’Riain, 2004).	1451
<b>Topography</b>	Covering NW Donegal (Figure 1), this SW-NE trending GWB accounts for approximately one third of the county. The vast majority of the body is bounded by coastline. The eastern and southern boundaries are coincident with topographic divides (Hydrometric Areas 39, 37 and 01). The generally mountainous topography is incised by large valleys, although becomes increasingly flatter towards the coast. Elevations range from sea level at the coast to 750 mAOD in the Derryveagh Mountain region, along the eastern boundary. Although the majority of surface water flows in a north-westerly direction, strong geological control on the topography also influences the surface drainage patterns in the eastern portion of the GWB, resulting in linear SW-NE or NE-SW flow directions. Other surface water features include over 550 lakes, which vastly ranging in surface area (e.g. square metres to square kilometres).		
	<b>Geology and Aquifers</b>	<b>Aquifer categories</b>	The majority of the GWB (just under 90%) is classified as <b>PI</b> : Poor aquifer which is generally unproductive except for local zones. There are also a number of SW-NE orientated bands of <b>Pu</b> : Poor aquifer, generally unproductive. Five smaller areas (<7 km <sup>2</sup> ) of <b>LI</b> : Locally important aquifer, moderately productive only in local zones are also noted.
<b>Main aquifer lithologies</b>		Precambrian Quartzites, Gneisses & Schists (52.84%) and Granites & Other Igneous Intrusive Rocks (44.86%) are the two main rock groups in this GWB (refer to Table 1). There are also seven small, isolated pockets of Precambrian Marbles (2.3%).	
<b>Key structures</b>		The rocks in this part of Donegal have been significantly deformed, resulting in a large number of approximately SW-NE faults (e.g. Lough Ea, Gweebarra, Glengash and Errig Faults) and the rock succession dipping predominantly to the SW and S, by between 20-80°. There are also a large number of anticline and syncline folds.	
<b>Key properties</b>		The limited well data (8 wells) all relate the Precambrian Quartzites, Gneisses and Schist/ Granites & Other Igneous Intrusive rocks groups i.e. PI/Pu aquifers. The yields range from 6-330 m <sup>3</sup> /d, with 6 yields <50 m <sup>3</sup> /d. No specific capacity or transmissivity data are available however, they are generally likely to be low in the Precambrian rocks. Values for similar Granites in the Leinster region range from 20-30 m <sup>2</sup> /d, suggesting that values for the Donegal Granites are in the same range as for the Precambrian rocks. Typical specific dry weather flows in the Precambrian Quartzites, Gneisses & Schists rock group in Donegal are low (0.41 to 1.1 l/s/km <sup>2</sup> at 5 stations), indicating that this aquifer does not make a significant baseflow contribution to streamflow. Storativity is also expected to be low, as would also be expected of the Granites rock group. Higher transmissivity values may be achieved in faulted zones, especially in the coarser-grained rocks with low clay content (e.g. quartzites, gneisses and granites).	

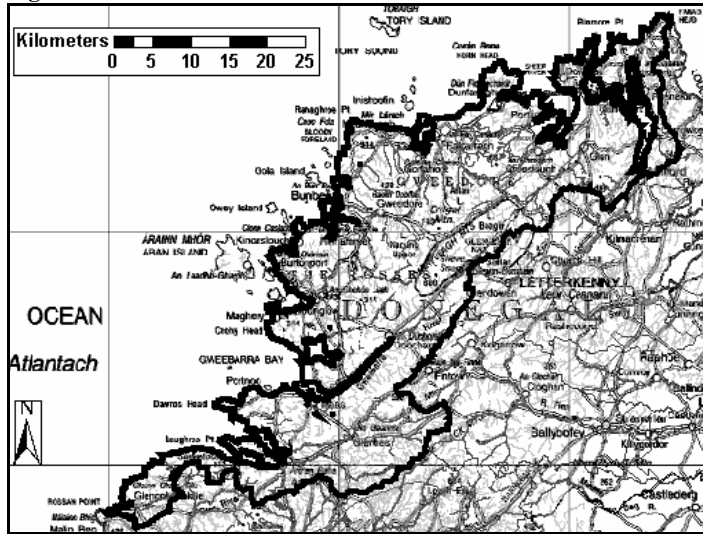
*1<sup>st</sup> Draft Northwest Donegal GWB Description – July 2004*

	<p>Although the Precambrian Marbles group is also categorised as a poorly productive aquifer, it is considered to be slightly more productive (LI) than the other Precambrian and Granite groups (PI/Pu). No data are available for the Marbles in this particular GWB however, additional information is available from other parts of County Donegal. Yields in the Raphoe and Manor Cunningham GWBs range from 2-1090 m<sup>3</sup>/d with an average of 202 m<sup>3</sup>/d (15 wells). Transmissivity values of 11 and 12 m<sup>2</sup>/d have been calculated for the Magherabeg/Veagh WSS (Manor Cunningham GWB), and 7 specific capacity values are available: 0.1, 0.4, 0.8, 4, 31, 82 and 165 m<sup>3</sup>/d/m. The same rocks also supply the Culdaff WSS: yield of 523 m<sup>3</sup>/d, transmissivity of c.110 m<sup>2</sup>/d, and specific capacity of 126 m<sup>3</sup>/d/m. Karstification may also occur in these rocks e.g. the Pollnapaste Cave, west Donegal (Parkes <i>et al</i>, 2000), and a ‘fractured cavity’ recorded in the Culdaff WSS borehole log, which possibly reflects some degree of solution. Overall, the data highlight that yields and transmissivities (calculated and implied) are variable and that there are productive zones in these rocks that may have been enhanced by karstification. Although better than the PI/Pu aquifers, transmissivity and storativity values are still thought to be relatively low.</p> <p>All 32 water levels are 0-8m below ground level (80% &lt;2 mbgl) although are inadequate to calculate groundwater gradients. However, these are expected to be relatively steep.</p> <p><i>(Precambrian Aquifer Chapter; Granites Aquifer Chapter; Donegal GWPS; Culdaff WSS Source Report; Magherabeg/Veagh WSS Source Report)</i></p>
	<p><b>Thickness</b> Most groundwater flux is expected to be in the uppermost part of the aquifer comprising a broken and weathered zone typically less than 3 m thick, a zone of interconnected fissuring c.10m thick, and a zone of isolated poorly connected fissuring typically less than 150 m. Slightly deeper water strikes are noted between 30-34 m bgl in 3 boreholes.</p>
<b>Overlying Strata</b>	<p><b>Lithologies</b> Just over half of the GWB is covered by peat, with 27% recorded as rock outcrop/shallow rock. A smaller proportion of the area (c.14%) is covered by till.</p>
	<p><b>Thickness</b> Subsoil is absent or thin over the majority of the upland areas in the GWB. Thicker deposits (&gt;3 m) occur in the lower-lying areas, especially along valleys and towards the coast, with the deposits of &gt;10 m thick limited to a number of small coastal areas (frequently sand and gravel deposits).</p>
	<p><b>% area aquifer near surface</b> <i>[Information will be added at a later date]</i></p>
	<p><b>Vulnerability</b> The majority of this GWB is classified as Extremely vulnerability, due to the high percentage of outcrop and thin subsoil. Where subsoil is thicker, such as in the valleys and along the coastline, the vulnerability ranges from High to Moderate, with occasional small areas of Low vulnerability that are associated with thicker pockets of peat.</p>
<b>Recharge</b>	<p><b>Main recharge mechanisms</b> Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of some subsoil deposits (e.g. thicker peat) and the aquifers, a high proportion of the effective rainfall will quickly discharge to the streams in the GWB. In addition, the steep slopes in the mountainous areas promote surface runoff. The relatively high stream density is likely to be influenced by the lower permeability rocks.</p>
	<p><b>Est. recharge rates</b> <i>[Information will be added at a later date]</i></p>
<b>Overlying Strata</b>	<p><b>Large springs and high yielding wells (m<sup>3</sup>/d)</b> Sources: Fanad North (Tri-a-Lough) WSS. Glencolumbkille Public Supply (135 m<sup>3</sup>/d). Springs : Toberkeen Spring (1820 m<sup>3</sup>/d). Excellent Wells: Rinmore (720 m<sup>3</sup>/d). Good Wells: Crocknamurleog (330 m<sup>3</sup>/d), Gortnalughoge (305 m<sup>3</sup>/d).</p>
	<p><b>Main discharge mechanisms</b> The main discharges are to the rivers and streams crossing the GWB, reflecting short groundwater flow paths. Small springs and seeps are likely to issue at the stream heads and along their course. Seepages will develop on the coastal cliff faces.</p>
	<p><b>Hydrochemical Signature</b> No data are available within this particular GWB.</p> <p><b>National classification:</b> Precambrian Quartzites, Gneisses &amp; Schists Non-calcareous with bi-modal alkalinity distribution although the higher range is possibly caused by thin marble bands and overlying limestone subsoil. Alkalinity (mg/l as CaCO<sub>3</sub>): range of 14-400; mean of 168 (41 ‘non limestone subsoils’ data points) Total Hardness (mg/l): range of 46-412; mean of 200 (39 ‘non limestone subsoils’ data points) Conductivity (µS/cm): range of 160-752; mean of 446 (45 ‘non limestone subsoils’ data points)</p> <p><b>National classification:</b> Granites &amp; Other Igneous Intrusive Rocks Non-calcareous rocks. Alkalinity (mg/l as CaCO<sub>3</sub>): range of 43-298; mean of 179 (22 ‘non limestone subsoils’ data points) Total Hardness (mg/l): range of 103-304; mean of 183 (10 ‘non limestone subsoils’ data points) Conductivity (µS/cm): range of 317-1017; mean of 495 (24 ‘non limestone subsoils’ data points)</p> <p>As minerals present in granite are generally acidic, corrosion and leaching of metals such as iron and manganese may present a problem. Radon and Uranium are also associated with granitic bodies.</p> <p><i>(Calcareous/Non calcareous classification of bedrock in the Republic of Ireland report)</i></p>

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<b>Groundwater Flow Paths</b>	In the absence of inter-granular permeability, groundwater flow is expected to be concentrated in upper fractured and weathered zones and in the vicinity of fault zones. Available groundwater levels are 0-10 m below ground level (80% <2 mbgl). Zones of preferential flow along faults have been interpreted in resistivity surveys in the Leinster granites (Daly, 1985). In the Marbles, the permeability of the fracture/fault zones may be enhanced by some degree of karstification. Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to nearby streams and small springs. Water strikes marginally deeper than the estimated interconnected fissure zone suggest a component of deep groundwater flow, however shallow groundwater flow is dominant. Groundwater flow directions are expected to follow topography – the predominant direction is north-westwards.
<b>Groundwater &amp; Surface water interactions</b>	Groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Baseflow to rivers and streams is relatively low.
<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>• The north-western boundary comprises circuitous coastline, extending from Fanad Head round to Malin Beg. Topographic divides (Hydrometric Areas 39, 37 and 01) comprises the eastern and southern GWB boundaries. The terrain is characteristically hilly to mountainous, incised by large valleys and with low-lying, flatter areas along the coast.</li> <li>• The GWB is composed primarily of low transmissivity rocks, although the Marbles (L1 aquifer) are likely to have slightly higher transmissivities than the Quartzites, Gneisses and Schists, and Granites rock groups (Pl/Pu).</li> <li>• Most of the groundwater flux is expected to be in the uppermost part of the aquifer comprising: a broken and weathered zone typically less than 3m thick; a zone of interconnected fissuring less than c.10m; and a zone of isolated fissuring typically less than 150m. Karstification may have enlarged the fractures/faults in the Marbles and there may be preferential flow pathways in the Granites.</li> <li>• Recharge occurs diffusely through the subsoil and rock outcrops, although is limited by any thicker peat and the generally low permeability bedrock. Therefore, most of the effective rainfall is not expected to recharge to aquifers.</li> <li>• Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to the streams crossing the aquifer, and to small springs and seeps. Overall, the flow direction is expected to be to the northwest, as determined by the topography.</li> <li>• Fanad North (Tri-a-Lough) WSS is located within this GWB.</li> </ul>
<b>Attachments</b>	Figure 1. List 1. Table 1.
<b>Instrumentation</b>	<p><b>Stream gauges:</b> 38001, 38002, 38003, 38004, 38005, 38006, 38007, 38008, 38009, 38010, 38011, 38012, 38013, 38070, 38071, 38072.</p> <p><b>EPA Water Level Monitoring boreholes:</b> None identified.</p> <p><b>EPA Representative Monitoring points:</b> (DON 026)</p>
<b>Information Sources</b>	<p>Daly (1985)</p> <p>Lee M. and Fitzsimons V. (2004). <i>County Donegal Groundwater Protection Scheme</i>. Main Report. Draft Report to Donegal County Council. Geological Survey of Ireland 58pp.</p> <p>Lee M. and Daly D. (2004). <i>Fanad North(Tri-a-Lough) Public Water Supply Scheme Source Protection Zones</i>. Draft Report to Donegal County Council. Geological Survey of Ireland 16pp.</p> <p>Long, C.B. &amp; McConnell B.J. (1997) <i>Geology of North Donegal: A geological description to accompany bedrock geology 1:100,000 scale map, Sheet 1 and part of Sheet2, North Donegal</i>. With contributions from P. O'Connor, K. Claringbold, C. Cronin and R. Meehan. Geological Survey of Ireland. 87pp</p> <p>O' Riain, G. 2004. <i>Water Dependent Ecosystems and Subtypes (Draft)</i>. Compass Informatics in association with National Parks and Wildlife (DEHLG). WFD support projects.</p> <p>Parkes, M., Johnston, D., Simms, M.J. and John G. Kelly (1999). <i>Geological guidance of speleogenesis in marble of the Dalradian Supergroup, County Donegal, Ireland</i>. Cave and Karst Science Vol. 26. No3. December 1999. Transactions of the British Cave Research Association.</p>
<b>Disclaimer</b>	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Figure 1. Location and Boundaries of GWB.



List 1. Lakes in GWB.

Aghnish Lough, Altan Lough, Araughran Lough, Ballaghfill Lough, Ballyboe Lough, Ballyhoofiskey Lough, Ballyhork Lough, Ballymagahy Lough, Ballynashannagh Lough, Black Lough, Blind Lough, Bonnyglen Lough, Bran Lough, Bunera Lough, East Carn Lough, Carnbeg Lough, Carnboy Lough, Carrick Lough, Casey Lough, Cashelnagor Lough, Castle Lough, Chapel lough, Cloghernasharragh Lough, Clonmore Lough, Clooney Lough, Columbcille's Lough, Crees Lough, Croaghnaishallog Lough, Croaghubrid Lough, Croloughan Lough, Derkmore Lough, Derryreel Lough, Doolough, Doon Lough, Drum Lough, Drumaneany Lough, Drumlek Lough, Drumnalough, Dunglow Lough, Dunlewy Lough, Eelburn Lough, Fallaneas Lough, Felmurry Lough, Ferry's Lough, Glen Lough, Glenisk Lough, Glenmanannive Lough, Glenree Lough, Glentornan Lough, Gortnaglen Lough, Gortnatraw Lough, Heather Loughs, Kilayenna Lough, Kill Lough, Kill Lough North, Killoughcarran Lough, Kiltooris Lough, Kiltyfanned Lough, Kincas Lough, Kindrum Lough, Kinny Lough, Knockastoller Lough, Lackaghatermon Lough, Lake Kip, Letterbologe Lough, Loch an Chaorain, Loch an Phoirt, Loch Bhaile na Creige, Loch na Ariann, Loch na Croiche, Lough Achreeve, Lough Achush, Lough Acloghbolie, Lough Acrockan, Lough Acruppane, Lough Adinn, Lough Adrima, Lough ADRAMAGH Lower, Lough ADRAMAGH Upper, Lough Agannive, Lough Agarvy, Lough Agher, Lough Agher, Lough Agrougla, Lough Ahassan, Lough Akeo, Lough Aleane, Lough Aleen, Lough Altaderry, Lough an tSeisigh, Lough Analta, Lough Analtmore, Lough Analtsallagh, Lough Aneane Beg, Lough Aneane More, Lough Anillan, Lough Atirrive Big, Lough Aallyduff, Lough Avarnis, Lough Beg, Lough Clananny, Lough Corveen, Lough Cruin, Lough Currin, Lough Doo, Lough Errig, Lough Fad, Lough Fadda, Lough Feane, Lough Finaghan, Lough Gannovegil, Lough Garrive, Lough Herwainan, Lough Lagha, Lough Leck, Lough Leveen, Lough Lilly, Lough Machugh, Lough Maumbeg, Lough Meenlackagh, Lough More, Lough Nabinny, Lough Naboll, Lough Nabrack, Lough Nabrackmore, Lough Nacanny, Lough Naclogh, Lough Nacreevagh, Lough Nacrick, Lough Nacroagh, Lough Nacroaghy, Lough Nacuskera, Lough Nagaddeen, Lough Nagreenan, Lough Nalaghty, Lough Naloughan, Lough Namona, Lough Namurleog, Lough Namurrig, Lough Nanuarragh, Lough Nanuroge, Lough Nascollop, Lough Nastackan, Lough Natooy South, Lough Noran, Lough Sallagh, Lough Shannagh, Lough Shliabh, Lough Slievesnaght, Lough Solomon, Lough Tirrim, Lough Trusk, Lough Veenmanus, Lough Veigha, Lough Wheeloge, Lough Achassan, Lough Achuller, Lough Acruppan, Lough Acusky, Lough Addoey, Lough Aderry, Lough Adoochro, Lough Adreen, Lough Adrihidbeg, Lough Agannive, Lough Agarrowen, Lough Agher, Lough Akeeran, Lough Akishaner O'Donnell, Lough Aleahan, Lough Aleck Beg, Lough Aleck More, Lough Aleen, Lough Altaderry, Lough Altanshesk, Lough Altbradagh, Lough Altercan, Lough Altmanus Lough Altnagrone, Lough Aluirg, Lough Anaffrin, Lough Analf, Lough Analtmore, Lough Analtsallagh, Lough Ananima, Lough Anassan, Lough Aneigh, Lough Anillan, Lough Anillar, Lough Animma, Lough Aninvar, Lough Anirvor, Lough Anlug, Lough Anna, Lough Annilanowennamarve, Lough Anoon, Lough Anulleb, Lough Anuller, Lough Anure, Lough Ardmeen, Lough Arogarrive, Lough Ascardan, Lough Astackan, Lough Astoller, Lough Ataggal, Lough Atallan, Lough Atar, Lough Atirrive, Lough Atirrive Beg, Lough Atirrive Little, Lough Atuilson, Lough Avadderralla, Lough Avaddy, Lough Awillan, Lough Awolie Crockacreaghan, Lough Awollane, Lough Awoty, Lough Ballyboy, Lough Barra, Lough Bartan, Lough Beagh, Lough Beg, Lough Birroge, Lough Botha, Lough Boughan, Lough Bracknagannore, Lough Brockagh, Lough Con, Lough Connell, Lough Cool, Lough Cor, Lough Cormick, Lough Craghy, Lough Craghy, Lough Cratland, Lough Creenmore, Lough Croaghanid, Lough Croaghballaghdown, Lough Croaghy, Lough Croananid, Lough Croangar, Lough Croanloughan, Lough Crockatrillan, Lough Crogher, Lough Crumbane, Lough Cushkeeragh, Lough Derryduff, Lough Dog, Lough Donnell, Lough Doo, Lough Doo East, Lough Doo South, Lough Doo West, Lough Downen, Lough Ea, Lough Fad, Lough Fadda, Lough Free, Lough Garry, Lough Great Beg, Lough Great More, Lough Greenan, Lough Gunnell, Lough Heladwa, Lough Ibbly, Lough Illion, Lough Keel Lough Keeran, Lough Keeranbeg, Lough Kip, Lough Lack, Lough Lack Beg, Lough Lack More, Lough Laragh, Lough Laub Lough Leaghan Beg, Lough Leaghan More, Lough Leahan, Lough Leckenagh, Lough Lobin, Lough Lunn, Lough Maam, Lough Machugh, Lough Machugh Beg, Lough Maddy, Lough Magee, Lough Maghery, Lough Magrath Beg, Lough Magrath More, Lough Meela, Lough Meenachrinna, Lough Meendruhurkin, Lough Meennascreeva, Lough Moilt, Lough Moolagh, Lough More, Lough Moroghy Beg, Lough Moroghy More, Lough na bPardog, Lough na Haltora, Lough Nabehy, Lough Nabrackbaddy, Lough Nabrackbeg, Lough Nabrackboy, Lough Nabrackdeilion, Lough Nabrackgal, Lough Nabrackmay, Lough Nabrackmea, Lough Nabrackmore, Lough Nabraddan, Lough Nabrattoe, Lough Nabuckan, Lough Nacarla, Lough Nacloghcor, Lough Nacloghmore, Lough Nacreaght, Lough Nacree, Lough Nacroaghy, Lough Nacung, Lough Nacung Upper, Lough Nacuskry, Lough Nadeal, Lough Nadourcon, Lough Nadreegar, Lough Nafulla, Lough Nafullanrany, Lough Nagapple, Lough Nagaradee, Lough Nagarnaman, Lough Nageeragh, Lough Nagilly, Lough Naglagary, Lough Naglea, Lough Nagowan, Lough Nagreagh, Lough Nagreaney, Lough Nagurragh, Lough Nakeer, Lough Namaddy, Lough Namanlagh, Lough Namansheefroge, Lough Nambraddan, Lough Nameeltoge, Lough Nameena, Lough Nameenagh, Lough Namoolagh, Lough Namuck, Lough Nanillan, Lough Napaste, Lough Naroon, Lough Nasahidra, Lough Nascaufey, Lough Nasharragh, Lough Nasmullan, Lough Nasmuttane, Lough Nasnanida, Lough Nasnanida, Lough Nastackagh, Lough Natackan, Lough Natangaduff, Lough Natooy, Lough Natooy North, Lough Naveeoge, Lough Navreaghoge, Lough Nawaugh, Lough Naweeloge, Lough Oughtreagh, Lough Owennamarve, Lough Pollroy, Lough Reelan, Lough Sallagh, Lough Salt, Lough Shivnagh, Lough Smuttan, Lough Nambraddan, Lough Toberkeen, Lough Tun, Lough Tunny, Lough Veenahoagh, Lough Voriskey, Lough Waskel, Lough Woula, Loughan Sallagh, Loughinisland, Loughnathreebrack, MacAlea's Lough, Maghera Lough, Manus' Lough, Meenatotan Lough, Meenbannad Lough Meenlaragh Lough, Meenleackalore Lough, Melmore Lough, Misty Lough South, Moorlagh, Morgan's Lough, Mullagherd Lough, Mullincrick Lough, Nabrackbaddy Lough, New Lake, Owenea Lough, Ponud Lough, Procklis Lough, Ranny Lough, Red Water Lough, Rinboy Lough, Rosepanna Lough, Sally's Lough, Sand Lough, Shanaghan Lough, Sheskin Lough, Sheskinmore Lough, Sladdamore Lough, Still Lough, Summy Lough, Tawny Lough, The Stags Lough, Theshkrane Lough, Toome Lough, Toragh Lough, Warvanneil Lough, White Lough.

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**Table 1. List of Rock units in Northwest Donegal GWB**

Rock Unit Name	Code	Description	Rock Unit Group	Aquifer Class.	% Area
Main Donegal Granite	MdGr	Coarse biotite granite & granodiorite	Granites & other Igneous Intrusive rocks	PI	19.51%
Thorr Granite	spTh	Coarse grained monzogranite to tonalite	Granites & other Igneous Intrusive rocks	PI	10.52%
Slieve Tooeey Quartzite Formation	ST	Whitish quartzite with pebble beds	Precambrian Quartzites, Gneisses & Schists	PI	10.45%
Ards Quartzite Formation	AQ	Whitish quartzite with pebble beds	Precambrian Quartzites, Gneisses & Schists	PI	9.96%
Termon Formation	TE	Banded semi-pelitic & psammitic schist	Precambrian Quartzites, Gneisses & Schists	PI	4.36%
Upper Falcarragh Pelite Formation	UF	Pelitic, semi-pelitic, psammitic schist	Precambrian Quartzites, Gneisses & Schists	Pu	4.30%
Creelough Formation	CS	Calcareous pelitic schist with marble	Precambrian Quartzites, Gneisses & Schists	PI	3.70%
Sessiagh-Clonmass Formation	mbSC	Quartzite, dolomitic marble & schist	Precambrian Quartzites, Gneisses & Schists	PI	3.52%
Lower Falcarragh Pelite Formation	LF	Grey carbonaceous pelitic schist	Precambrian Quartzites, Gneisses & Schists	Pu	3.45%
Metadolerite	Md	Hornblende and sometimes schistose	Precambrian Quartzites, Gneisses & Schists	PI	3.14%
Ards Pelite Formation	AP	Black pelitic schist; transition at top	Precambrian Quartzites, Gneisses & Schists	Pu	2.52%
Trawenagh Bay Biotite Granite	TrG1	Biotite granite, medium-coarse	Granites & other Igneous Intrusive rocks	PI	2.17%
G3 variety	ArG3	Granodiorite (equigranular)	Granites & other Igneous Intrusive rocks	PI	1.89%
G1 variety	RsG1	Medium grained biotite granite	Granites & other Igneous Intrusive rocks	PI	1.66%
Slieve League Formation	SL	Flaggy quartzite and dark schist	Precambrian Quartzites, Gneisses & Schists	PI	1.60%
G2 variety	ArG2	Quartz monzodiorite to tonalite, coarse	Granites & other Igneous Intrusive rocks	PI	1.48%
G2 variety	RsG2	Coarse grained biotite granite	Granites & other Igneous Intrusive rocks	PI	1.45%
Upper Crana Quartzite Formation	UC	Psammitic schist with pebbly grit beds	Precambrian Quartzites, Gneisses & Schists	PI	1.30%
Trawenagh Bay Biotite-muscov. Granite 2	TrG2	Biotite-muscovite granite, medium-coarse	Granites & other Igneous Intrusive rocks	PI	1.15%
Gaugin Quartzite Formation	GA	Pale quartzite, pebble beds, rare schist	Precambrian Quartzites, Gneisses & Schists	PI	1.07%
Falcarragh Limestone Formation	FL	Blue-grey banded marble, pelite partings	Precambrian Marbles	LI	1.06%
Appinite suite	Ap	undifferentiated	Granites & other Igneous Intrusive rocks	PI	0.97%
G1 variety	ArG1	Quartz monzodiorite	Granites & other Igneous Intrusive rocks	PI	0.83%
G3 variety	RsG3	Medium grained biotite-muscovite granite	Granites & other Igneous Intrusive rocks	PI	0.83%
Fanad Granite	FaX	xenolithic facies	Granites & other Igneous Intrusive rocks	PI	0.76%
Fanad Granite	Fa	Coarse granodiorite to monzogranite	Granites & other Igneous Intrusive rocks	PI	0.65%
Sessiagh-Clonmass Formation	SC	Quartzite, dolomitic marble & schist	Precambrian Quartzites, Gneisses & Schists	PI	0.64%
Glencolumbkille Limestone Formation	GL	Dolomitic marble & semi-pelitic schist	Precambrian Marbles	PI	0.56%
Loughros Formation	LO	Quartzite with semi-pelitic schist	Precambrian Quartzites, Gneisses & Schists	Pu	0.53%
Port Askaig Formation	PA	Diamictite, schist & quartzite	Precambrian Quartzites, Gneisses & Schists	Pu	0.39%
Microgranite and related rocks	mGr	Porphyritic & non-porphyritic sheets	Granites & other Igneous Intrusive rocks	PI	0.37%
Glencolumbkille Pelite Formation	GP	Black graphitic pelitic schist	Precambrian Quartzites, Gneisses & Schists	Pu	0.33%
Lower Crana Quartzite Formation	LC	Psammitic schist, some marble beds	Precambrian Quartzites, Gneisses & Schists	PI	0.25%
Clonmass Limestone Member	SCcl	Dolomitic marble, calc & pelitic schist	Precambrian Marbles	PI	0.25%
Port Askaig Formation	PA	Diamictite, schist & quartzite	Precambrian Quartzites, Gneisses & Schists	Pu	0.23%
Croveenanta Formation	CV	Schist, calc schist, quartzite & marble	Precambrian Quartzites, Gneisses & Schists	PI	0.21%
Trawenagh Bay Biotite-muscov. Granite 3	TrG3	Biotite-muscovite granite contact zone	Granites & other Igneous Intrusive rocks	PI	0.21%
Marble	mb	Marble	Precambrian Marbles	PI	0.21%
Trawenagh Bay Aplogranite	TrAg	Muscovite aplogranite gradational margin	Granites & other Igneous Intrusive rocks	PI	0.17%

*1<sup>st</sup> Draft Northwest Donegal GWB Description – July 2004*

<b>Rock Unit Name</b>	<b>Code</b>	<b>Description</b>	<b>Rock Unit Group</b>	<b>Aquifer Class.</b>	<b>% Area</b>
Thorr Granite migmatitic facies	ThMi	Variable contact facies; abundant rafts	Granites & other Igneous Intrusive rocks	PI	0.14%
Lough Mourne Formation	LM	Quartz & feldspar pebbles, green matrix	Precambrian Quartzites, Gneisses & Schists	PI	0.13%
Knockletteragh Member	TEkg	Pebbly grits	Precambrian Quartzites, Gneisses & Schists	PI	0.12%
Cranford Limestone Formation	CR	Quartzite breccia & marble	Precambrian Marbles	PI	0.11%
Croaghubbrid Pelite Formation	CH	Graphitic pelite, thin psammite, marble	Precambrian Quartzites, Gneisses & Schists	Pu	0.10%
Semi-pelite	sp	Semi-pelite	Precambrian Quartzites, Gneisses & Schists	PI	0.10%
Lough Eske Psammite Formation	LE	Feldspathic psammite; quartzite, marble	Precambrian Quartzites, Gneisses & Schists	PI	0.10%
Port Limestone Member	SCpl	Blue-grey dolomitic marble with flags	Precambrian Marbles	PI	0.09%
Boultypatrick (Grit) Formation	BO	Psammite, graphitic clasts/beds, pebbles	Precambrian Quartzites, Gneisses & Schists	PI	0.08%
Trawenagh Bay Transitional G1/G2 Granite	TrTr	Muscovite-biotite granite, transitional	Granites & other Igneous Intrusive rocks	PI	0.07%
Pelite	pe	Pelite	Precambrian Quartzites, Gneisses & Schists	Pu	0.07%
Appinite suite intrusive breccia	Ab	Wallrock in appinitic matrix, also as *	Precambrian Quartzites, Gneisses & Schists	PI	0.07%
Lithologically diverse	mx	Lithologically diverse	Precambrian Quartzites, Gneisses & Schists	PI	0.07%
G4 variety	RsG4	Muscovite granite	Granites & other Igneous Intrusive rocks	PI	0.03%
Altan Limestone Formation	AL	White calcitic marble, some graphite	Precambrian Marbles	PI	0.02%
Tectonic schist	ts	Mylonitic	Precambrian Quartzites, Gneisses & Schists	PI	0.01%
Quartzite	qz	Quartzite	Precambrian Quartzites, Gneisses & Schists	PI	0.01%
Killeter Quartzite Formation	KT	Slightly impure quartzite	Precambrian Quartzites, Gneisses & Schists	PI	0.01%
Dolerite and Gabbro	D	Silica poor, with analcime & olivine	Granites & other Igneous Intrusive rocks	PI	0.01%
Hornblende diorite	H	Hornblende diorite	Precambrian Quartzites, Gneisses & Schists	PI	0.005%