ICHTHYO DIVERSITY OF BEAS RIVER SYSTEM, NORTH WESTERN HIMALAYA (H.P.), INDIA

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Beas River is one of the largest Rivers of Himachal Pradesh and has maximum stretch of about 57% (256 kms) in the State. Due to vast variation of altitude of the River (300 to 4000m asl) the fish diversity of the River is overwhelming. It comprises 63 fish species belonging to 44 genera, 14 families and 07 orders. The distribution and conservation status has been assessed. During the studies it has been observed that due various anthropogenic stresses the fish fauna is under threat and conservation measures should be adhered to conserve the habitat of the fishes.

Key words: Beas, Conservation, Anthropogenic, Himachal Pradesh

Fish species have been reported from the Himalaya (Gopi et al., opcit; Nautiyal 2005). The fish fauna of Himachal Pradesh from various habitats have been worked out by various workers time to time viz. Day (1875-1878), Hora (1937), Menon (1962; 1987; 1999), Bhatnagar (1973), Seghal (1974), Tilak and Hussain (1977), Sharma and Tandon (1990), Johal et al., (2002; 2003), Dhanze and Dhanze (2004), and Mehta & Uniyal (2005). There is no any information of fish fauna drainage wise. Keeping in view the present studies has been undertaken to work out the fauna of the Beas River System and its tributaries in North Western Himalaya (H.P.).

MATERIALS AND METHODS
The studies are based on the surveys undertaken of the drainage system of Beas River in its tributaries viz. Poon, Sansal, Awa, Neugal, Binwa, Sukad Dehar, Dehari, Mole, Baner, Sukhad, Uhl, Manuni, Khaouli, Baharal, Jabbar, Chambi, Dehar, Dehri, Beas River, Jauni, Kholi, Khoti, Rena, Bajgar, Gugali, Nari, Laghed, Sohan, Arnodi, Tirthan, Choki, Gaj, Manjhi, Arnodi and Gyun in district Kangra and Mandi. The fishes were collected with the help of hook, cast, Hand and Drag Net. The specimens were preserved in 10% formalin. Identification is based on Talwar & Jhingran (1991) and Jayaram (1999) and classification is as per the Catalog of Fishes (Eschmeyer et al., 2016). The conservation status of the species has been discussed on the basis of IUCN Red List of Threatened Species, website www.iucnredlist.org.

RESULT AND DISCUSSION
During the present studies a total of 63 fish species belonging to 44 genera, 14 families and 07 orders were recorded from
Table-1: Systematic list, distribution and status of fishes from Beas River, Himachal Pradesh

<table>
<thead>
<tr>
<th>S. N</th>
<th>Species Name</th>
<th>Common Name</th>
<th>Distribution</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ORDER: OSTEOGLOSSIFORMES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FAMILY: NOTOPTERIDAE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Notopterus notopterus (Pallas)</td>
<td>Grey featherback</td>
<td>Punjab, Assam, Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>Barilius bendelisis (Hamilton)</td>
<td>Hamilton’s barila</td>
<td>Jammu &amp; Kashmir, Assam, Meghalaya, Bihar, Haryana, Karnataka, Kerala, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal, Maharashtra and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>3</td>
<td>Barilius barila (Hamilton)</td>
<td>Barred barila</td>
<td>Jammu and Kashmir, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal, Assam, Manipur, Nagaland and Orissa, Burma and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>4</td>
<td>Barilius barna (Hamilton)</td>
<td>Barna baril</td>
<td>Uttar Pradesh, Assam, Bihar, West Bengal, Karnataka, Meghalaya, Orissa, Rajasthan, Sikkim, Burma and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>5</td>
<td>Barilius vagra (Hamilton)</td>
<td>Vagra barila</td>
<td>Assam, Bihar, Delhi, Jammu and Kashmir, Punjab, Sikkim, Uttar Pradesh, West Bengal and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>6</td>
<td>Raiamas bola (Hamilton)</td>
<td>Indian Trout</td>
<td>Haryana, Uttar Pradesh, Bihar, Assam, Orissa, West Bengal and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>7</td>
<td>Danio rerio (Hamilton)</td>
<td>Zebra Fish</td>
<td>Uttar Pradesh, Andhra Pradesh, Bihar, Karnataka, Orissa, Punjab, Sikkim, Tamil Nadu, West Bengal and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>8</td>
<td>Devario devario (Hamilton)</td>
<td>Devario diano</td>
<td>Jammu and Kashmir, Uttar Pradesh, Assam, Bihar, Gujarat, Punjab, Haryana, Orissa, Rajasthan, West Bengal, Bangladesh, Burma and Himachal Pradesh</td>
<td>DD</td>
</tr>
<tr>
<td>9</td>
<td>Esomus danicus (Hamilton)</td>
<td>Flying barb</td>
<td>Jammu and Kashmir, Punjab, Uttar Pradesh, Assam, Bihar, De Ihi, Goa, Daman and Diu, Gujarat, Madhya Pradesh, Orissa, Tamil Nadu, West Bengal and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>10</td>
<td>Rasbora daniconius (Hamilton)</td>
<td>Blackline rasbora</td>
<td>Throughout India</td>
<td>LC</td>
</tr>
<tr>
<td>11</td>
<td>Tor putitora (Hamilton)</td>
<td>Putitor Mahseer</td>
<td>Throughout Northern States (All along Himalayas)</td>
<td>EN</td>
</tr>
<tr>
<td>12</td>
<td>Tor tor (Hamilton)</td>
<td>Tor Mahseer</td>
<td>All northern states</td>
<td>NT</td>
</tr>
<tr>
<td>13</td>
<td>Pethia ilico (Hamilton)</td>
<td>Two-spot barb</td>
<td>Through Indian Subcontinent and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>14</td>
<td>Pethia conchonius (Hamilton)</td>
<td>Rosy Barb</td>
<td>Through Indian Subcontinent and Himachal Pradesh</td>
<td>LC</td>
</tr>
</tbody>
</table>

cont.
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Common Name</th>
<th>Distribution</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td><em>Puntius sophore</em> (Hamilton)</td>
<td>Spot fin swamp Barb</td>
<td>Through Indian Subcontinent</td>
<td>LC</td>
</tr>
<tr>
<td>16</td>
<td><em>Puntius chola</em> (Hamilton)</td>
<td>Chola Barb</td>
<td>Throughout India</td>
<td>LC</td>
</tr>
<tr>
<td>17</td>
<td><em>Systomus sarana</em> (Hamilton)</td>
<td>Olive Barb</td>
<td>Through Indian Subcontinent</td>
<td>LC</td>
</tr>
<tr>
<td>18</td>
<td><em>Schizothorax richardsonii</em> (Gray)</td>
<td>Gugali</td>
<td>Jammu and Kashmir, Punjab, Uttar Pradesh, Assam, Sikkim and Himachal Pradesh:</td>
<td>VU</td>
</tr>
<tr>
<td>19</td>
<td><em>Carassius auratus</em> (Linnaeus)</td>
<td>Golden Carp</td>
<td>Throughout Indian subcontinent</td>
<td>INTR</td>
</tr>
<tr>
<td>20</td>
<td><em>Carassius carassius</em> (Linnaeus)</td>
<td>Crucian Carp</td>
<td>Throughout Indian Subcontinent</td>
<td>INTR</td>
</tr>
<tr>
<td>21</td>
<td><em>Ctenopharyngodon idella</em> (Valenciennes)</td>
<td>Grass Carp</td>
<td>Introduced in India</td>
<td>INTR</td>
</tr>
<tr>
<td>22</td>
<td><em>Hypophthalmichthys molitrix</em> (Valenciennes)</td>
<td>Silver Carp</td>
<td>Throughout India</td>
<td>INTR</td>
</tr>
<tr>
<td>23</td>
<td><em>Cyprinus carpio communis</em> Linnaeus</td>
<td>Scale Carp</td>
<td>Throughout India</td>
<td>INTR</td>
</tr>
<tr>
<td>24</td>
<td><em>Cyprinus carpio specularis</em> Lacepede</td>
<td>Mirror Carp</td>
<td>Throughout India</td>
<td>INTR</td>
</tr>
<tr>
<td>25</td>
<td><em>Cyprinus carpio nudus</em> Bloch</td>
<td>Mirror Carp</td>
<td>Throughout India</td>
<td>INTR</td>
</tr>
<tr>
<td>26</td>
<td><em>Gibelion catla</em> (Hamilton)</td>
<td>Catla</td>
<td>Throughout India</td>
<td>LC</td>
</tr>
<tr>
<td>27</td>
<td><em>Cirrhinus mirgala</em> (Hamilton)</td>
<td>Mrigal</td>
<td>Northern India</td>
<td>LC</td>
</tr>
<tr>
<td>28</td>
<td><em>Cirrhinus reba</em> (Hamilton)</td>
<td>Reba Carp</td>
<td>Throughout India</td>
<td>LC</td>
</tr>
<tr>
<td>29</td>
<td><em>Labeo rohita</em> (Hamilton)</td>
<td>Rohu</td>
<td>Punjab, Delhi, Uttar Pradesh, Assam, Bihar, Gujarat, Madhya Pradesh, Maharashtra, Orissa, West Bengal (Introduced) and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>30</td>
<td><em>Labeo bata</em> (Hamilton)</td>
<td>Bata labeo</td>
<td>Uttar Pradesh, Madhya Pradesh, Bihar, Orrisa, West Bengal, Maharashtra, Andhra Pradesh and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>31</td>
<td><em>Labeo calbasu</em> (Hamilton)</td>
<td>Kalabasu</td>
<td>Punjab, Delhi, Assam, Bihar, Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu, Uttar Pradesh and West Bengal and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>32</td>
<td><em>Labeo dyocheilus</em> (McClelland)</td>
<td>Brahmaputra labeo</td>
<td>Jammu and Kashmir, Punjab, Uttar Pradesh, Assam, Sikkim and Himachal Pradesh</td>
<td>LC</td>
</tr>
</tbody>
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cont.
<table>
<thead>
<tr>
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<th>Common Name</th>
<th>Distribution</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td><em>Tariqilabeo latius</em> (Hamilton)</td>
<td>Gangetic latia</td>
<td>Northern states along the Himalayas</td>
<td>LC</td>
</tr>
<tr>
<td>34</td>
<td><em>Tariqilabeo diplochilus</em> (Heckel)</td>
<td>Tellarree, Behrah</td>
<td>India: Himachal Pradesh, Jammu and Kashmir, Punjab, Delhi, Uttar Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>35</td>
<td><em>Garra gotyla</em> (Gray)</td>
<td>Gotyla</td>
<td>Jammu and Kashmir, Assam, Bihar, Delhi, Manipur, Nagaland, Punjab, Rajasthan, Sikkim, Uttarakhanda Pradesh, Madhya Pradesh, West Bengal, Manipur and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>36</td>
<td><em>Garra lamta</em> (Hamilton)</td>
<td>Lamta Garra</td>
<td>Assam, Sikkim, Darjeeling and Kumaon Himalayas and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>37</td>
<td><em>Paracanthocobitis botia</em> (Hamilton)</td>
<td>Botia Loach</td>
<td>Uttar Pradesh, Uttarakhand, Assam, Bihar and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>38</td>
<td><em>Nemacheilus corica</em> (Hamilton)</td>
<td>Corica Loach</td>
<td>Occurs in Himalayas from Darjeeling through Kumaon to Himachal Pradesh and Punjab in Sutlej basin</td>
<td>LC</td>
</tr>
<tr>
<td>39</td>
<td><em>Schistura horai</em> (Menon)</td>
<td>Horai Loach</td>
<td>Jammu and Kashmir, Punjab and Himachal Pradesh</td>
<td>VU</td>
</tr>
<tr>
<td>40</td>
<td><em>Paraschistura montana</em> (Hamilton)</td>
<td>Mountain Loach</td>
<td>Uttarakhand, Jammu and Kashmir, Bihar and Himachal Pradesh</td>
<td>NE</td>
</tr>
<tr>
<td>41</td>
<td><em>Botia lohachata</em> Chaudhuri</td>
<td>Y-Loach</td>
<td>Uttarakhand, Bihar, Delhi, Rajasthan and Himachal Pradesh</td>
<td>NE</td>
</tr>
<tr>
<td>42</td>
<td><em>Botia biridi</em> Chaudhuri</td>
<td>Birdi loach</td>
<td>India: Himachal Pradesh, Jammu and Kashmir, Punjab, Assam and West Bengal</td>
<td>NE</td>
</tr>
<tr>
<td>43</td>
<td><em>Lepidocephalichthys guntea</em> (Hamilton)</td>
<td>Guntea Loach</td>
<td>Throughout Northern States</td>
<td>LC</td>
</tr>
</tbody>
</table>

**ORDER: SILURIFORMES**

**FAMILY: BAGRIDAE**

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td><em>Sperata aor</em> (Hamilton)</td>
<td>Long-whiskered cat fish</td>
<td>Throughout Indian Subcontinent</td>
<td>LC</td>
</tr>
<tr>
<td>45</td>
<td><em>Sperata seenghala</em> (Sykes)</td>
<td>Seenghari</td>
<td>Throughout Indian subcontinent</td>
<td>LC</td>
</tr>
<tr>
<td>46</td>
<td><em>Mystus bleekeri</em> (Day)</td>
<td>Day’s mustus</td>
<td>All north India states</td>
<td>LC</td>
</tr>
</tbody>
</table>

**FAMILY: SILURIDAE**

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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td><em>Wallago attu</em> (Schneider)</td>
<td>Freshwater Shark</td>
<td>Throughout India</td>
<td>NT</td>
</tr>
</tbody>
</table>

**FAMILY: SCHILBEIDAE**

<table>
<thead>
<tr>
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<th>Common Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td><em>Clupisoma garua</em> (Hamilton)</td>
<td>Garua Bachaha</td>
<td>Throughout India except south of Mahanadi</td>
<td>LC</td>
</tr>
<tr>
<td>FAMILY: AMBLYCIPITIDAE</td>
<td>49</td>
<td>Amblyceps mangois (Hamilton)</td>
<td>Indian Torrent Catfish</td>
<td>Uttarakhand, Meghalaya, Manipur, Punjab, Uttar Pradesh, West Bengal and Himachal Pradesh</td>
</tr>
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<td>------------------------</td>
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</tr>
<tr>
<td>FAMILY: SISORIDAE</td>
<td>50</td>
<td>Bagarius bagarius (Hamilton)</td>
<td>Gangetic goonch</td>
<td>Throughout India</td>
</tr>
<tr>
<td>51</td>
<td>Glyptothorax conirostrae (Steindachner)</td>
<td>Glyptothorax</td>
<td>Jammu and Kashmir, Uttarakhand and Himachal Pradesh</td>
<td>DD</td>
</tr>
<tr>
<td>52</td>
<td>Glyptothorax pectinopterus (McClelland)</td>
<td>Glyptothorax</td>
<td>Jammu and Kashmir, Uttarakhand and Himachal Pradesh</td>
<td>LC</td>
</tr>
<tr>
<td>53</td>
<td>Glyptothorax stoliczkae (Steindachner)</td>
<td>Glyptothorax</td>
<td>Himachal Pradesh</td>
<td>NE</td>
</tr>
<tr>
<td>FAMILY: HETEROPNEUSTIDAE</td>
<td>54</td>
<td>Heteropneustes fossilis (Bloch)</td>
<td>Stinging Catfish</td>
<td>Punjab, Bihar, Uttar Pradesh, Uttarakhand, West Bengal, Orissa, Madhya Pradesh and Himachal Pradesh</td>
</tr>
<tr>
<td>ORDER: SALMONIFORMES</td>
<td>FAMILY: SALMONIDAE</td>
<td>55</td>
<td>Oncorhynchus mykiss (Smith &amp; Stearby)</td>
<td>Rainbow Trout</td>
</tr>
<tr>
<td>56</td>
<td>Salmo trutta fario Linnaeus</td>
<td>Brown Trout</td>
<td>Jammu and Kashmir, Uttarakhand and Himachal Pradesh</td>
<td>INTR</td>
</tr>
<tr>
<td>ORDER: BELONIFORMES</td>
<td>FAMILY: BELONIDAE</td>
<td>57</td>
<td>Xenentodon cancila (Hamilton)</td>
<td>Needle Fish</td>
</tr>
<tr>
<td>FAMILY: MASTACEMBELIDAE</td>
<td>58</td>
<td>Mastacembelus armatus (Lacepede)</td>
<td>Tire-trackspiny eel</td>
<td>Throughout Indian Subcontinent</td>
</tr>
<tr>
<td>ORDER: PERCIFORMES</td>
<td>FAMILY: AMBASSIDAE</td>
<td>59</td>
<td>Pseudambassis baculis (Hamilton)</td>
<td>Himalayan glassy perchlet</td>
</tr>
<tr>
<td>FAMILY: GOBIIDAE</td>
<td>60</td>
<td>Glossogobius giuris (Hamilton)</td>
<td>Tank Goby</td>
<td>Throughout India</td>
</tr>
<tr>
<td>FAMILY: CHANNIDAE</td>
<td>61</td>
<td>Channa gadua (Schneider)</td>
<td>Snake Headed Fish</td>
<td>Throughout India</td>
</tr>
<tr>
<td>62</td>
<td>Channa marulius (Hamilton)</td>
<td>Snake Headed Fish</td>
<td>Throughout India</td>
<td>LC</td>
</tr>
<tr>
<td>63</td>
<td>Channa punctata (Bloch)</td>
<td>Spotted Snake Headed Fish</td>
<td>Throughout India</td>
<td>LC</td>
</tr>
</tbody>
</table>
Beas River, Himachal Pradesh (Table-1). Fish fauna is dominated by the members of the family Cyprinidae (42 spp.) followed by Sisoridae (04 spp.), Bagridae, Chanidae (03 spp.); Salmonidae (02 spp.) and families Siluridae, Schilbeidae, Amblycipitidae, Heteropneustidae, Belonidae, Mastacembelidae Gobiidae each with one species. Due to vast variation of altitude (300-4000m asl), the Beas River harbours both warm as well as cold water fishes. The cold water fishes have the importance in terms of food, sport and ornamental value. Tor, Schizothorax, Barilius, Bangana, Garra, Schistura, Triplophysa spp. are the important indigenous cold water fishes. Trout and Carps are the exotic fishes which are exploited for the aquaculture practices in the region. Tor putitora (Hamilton) comes under Endangered (EN); Tor tor (Hamilton), Wallago attu (Schneider), Bagarius bagarius (Hamilton) Near threatened (NT) and Schizothorax richardsonii (Gray), Schistura horai (Menon), Vulnerable (VU) category as per the IUCN status.

During the studies the species association of Schizothorax richardsonii (Gray) was mainly observed with the Barilius bengdelis (Hamilton) and Barilius barila (Hamilton) at Poon, Awa, Binwa, Sukhad stream in deep pools and torrential streams. However Pethia ticto (Hamilton), Tor putitora (Hamilton) were also observed with association of Schizothorax richardsonii (Gray) in down streams. It has been observed that the heavy floods and landslide during monsoon and post monsoon in River Beas affect the diversity and population of fishes, as it changes the geomorphology of the area and increases the siltation in the river bed. Thus, the water current slow down and isolated pools are formed, which are not preferable habitat of many torrential fishes. Due to pollution, illegal poaching and the extraction of stones, sand, pebbles, etc. increases the siltation load in the River. Further, two dams viz. Pong and Pandoh have been constructed on the River Beas, thus habitats have been changed from lotic to lentic and migration Tor putitora (Hamilton) has greatly affected. Due to siltation Schizothorax richardsonii (Gray) has almost disappeared from the Pong Dam. It has been observed that fishes are protected in the pools locally called Machyal due to religious sentiments in the region. Likewise large area can be decated as the fish sanctuaries in the region which will be useful for the conservation of fish water resources. fishes are bioindicator of the aquatic ecosystem. The comprehensive knowledge of taxonomy and environment requirements for the conservation of the habitation is the prerequiste (Chovance et al., 2003).Therefore, awareness to local people is utmost important and will go a long way for the conservation of any aquatic ecosystem.

ACKNOWLEDGEMENTS
I am grateful to Director, Zoological Survey of India, Kolkata and Officer-in-Charge, HARC, ZSI, Solan (H.P.) for providing facilities and encouragement.

REFERENCES